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AVIATION

The Oldest American Aeronautical Magazine

THE STORY OF *Aircraft Tubing*

THE *"Flying Wing"*

Legal Problems FACE THE *Airlines*

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Associate Editor

Leslie E. Neville
Technical Editor

Charles H. Gale

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Pacific Coast Editor

AVIATION

The Oldest American Aeronautical Magazine

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Contents for March 29, 1930

Volume 28, Number 13

COMING

¶Airplane photography in Alaska. ¶A description of the Curtiss-Chicago Airport. ¶Coming descriptions—the Curtiss Condor, the new Keystone Loening Amphibian, the Savoia-Marchetti amphibian.

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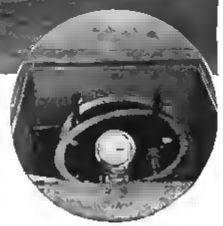
Large new hangar of the Curtiss Flying Service at the Buffalo Airport. In circle, one of the meter pumps sunk in the runway



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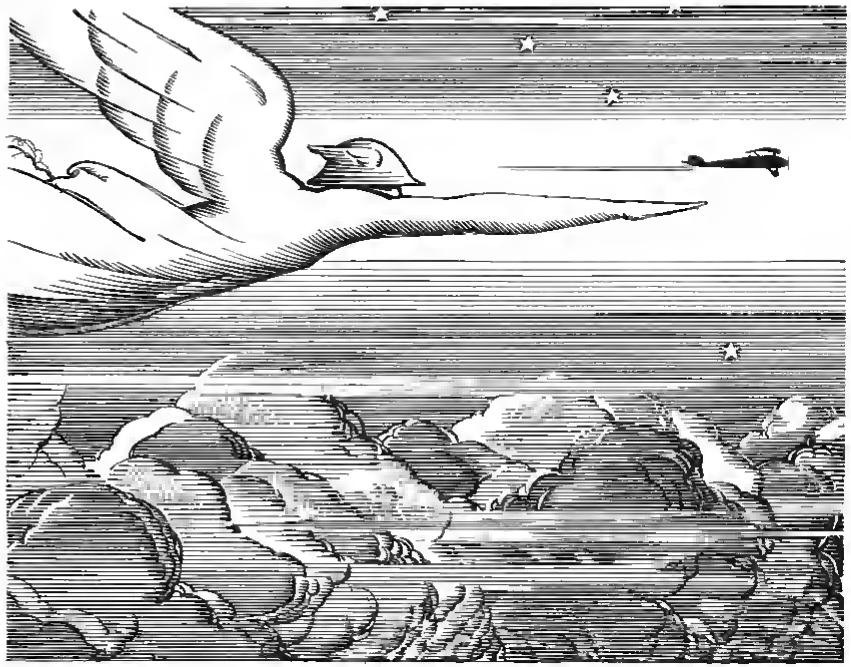

BOUND for Europe, 344,023 people crossed the Atlantic from American ports in the year 1928. For business or pleasure 3,000,000 boarded airplanes last year, and flew a hundred million miles. Thus it took but six average flying weeks for Aviation's passenger list to equal and exceed that of trans-Atlantic steamships for one solid year. And this shows how Flying under business-like methods, with newer and stronger planes and equipment, and more rugged and reliable Wright engines, has thrust itself into the lives and every-day habits of millions of people!

WRIGHT

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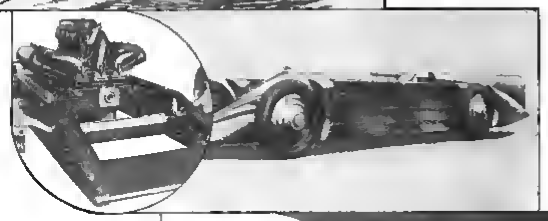
Dependable materials are the best assurance of dependable performance

Upper left: Rolls Royce engine and Supermarine S-6 seaplane which won Schneider cup, 1929. Center: Segrave racing car "Golden Arrow" with Nickel Alloy Steels in axles, frames, transmission and steering parts. Lower right: Segrave speed boat "Miss England" equipped with 900 H.P. Napier Lion engine. (The "Golden Arrow" was designed by Capt. J. S. Irving as was also the transmission of the "Miss England".) All these record-making engines have Nickel Alloy Steel in vital parts.



IN THE AIR...
ON LAND...
IN WATER...

WORLD'S RECORD SPEEDS

with vital parts of Nickel Alloy Steel

Nickel Alloy Steel was specified for important moving parts of the Rolls-Royce engine used in the Supermarine S-6 seaplane which won the 1929 Schneider trophy by attaining a speed of 357.7 m. p. h. Nickel Steels were likewise used in the Napier engine, and in the clutch and transmission gears in the Segrave motor boat "Miss England", which holds the speed record for single-engine craft. In the "Golden Arrow", the Segrave racing car with a record of 231.3 m. p. h., also powered with a Napier engine, practically every part subject to stress, impact and wear was made of a Nickel Alloy Steel.

The shocks and stresses encountered in attaining these tremendous speeds are so vast and complex, and the prevention of failure in any part so essential, that these record marks on land, in the air, and on water constitute a vivid proof of the variety of applications as well as the dependability of Nickel Alloy Steel under the severest conditions.

The qualities of toughness, strength and shock-resistance which led to the choice of Nickel Steels for use in these super-efficient machines, together with other factors, such as ease of heat treatment and high strength-to-weight ratio, are resulting in an ever-increasing use of these steels in aeronautical, automotive and marine engineering.

Nickel
FOR ALLOY STEEL

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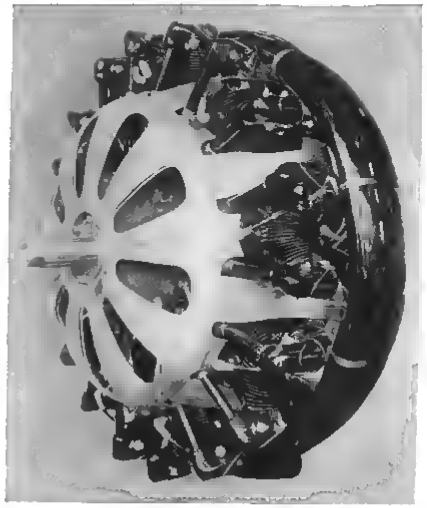
NEW COWLING and MANIFOLD for WASP JUNIOR



A new exhaust collector, nose cowling and pre-heater combination is now ready for use on the "Wasp Junior" 300 H. P. engine, insuring proper engine operation under all weather conditions.

All parts of the cowling and collector are accessible, and engine and accessories may readily be reached. Individual parts may be replaced without disturbing the unit as a whole. Further, the cowling is so constructed that the airplane designer is completely unhampered in providing for its use.

The collector ring is mounted on the rear of the engine. It is elliptical in section and carries a single outlet delivering exhaust gases either to a tail pipe or directly to the atmosphere. Due to adequate ribbing and solid mounting, the cowl is extremely rigid. Shutters are adjustable and a convenient control is provided.

The fairing and hot air stove serve the dual purpose of decreasing engine drag and the provision of ample quantities of heated air for the carburetor under the coldest operating conditions. This new unit has been designed for durability and long service. Materials and workmanship conform to the rigid standards of Pratt & Whitney quality.

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Wasp & Hornet *Engines*

AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A McGraw-Hill Publication Established 1916

EDWARD P. WARNER *Editor*

Volume 28 . . . *March 29, 1930* . . . Number 13

Pilot Responsibility—The Question of the Hour

ALMOST without realizing it the aviation industry has made an enormous stride in the last six months. A taboo has been lifted. The wrappings upon a constant and a disturbing problem has been unswerved and the fresh air of discussion has been let in upon it. For the first time it has become not only permissible but fashionable to talk about safety, and to talk about it not by indirection, but in terms of candor and veracity.

In making a safety record, good or bad, there are four factors: equipment, personnel, ground facilities along the route and general organization of control and inspection divide the responsibility. The presumption is fair that most of the air lines are using the best equipment available for their purposes, and that safety is a consideration present in their minds when they select it. There is no possibility of sudden improvement there except in certain accessories and in the modification of details of interior arrangement which may determine whether a minor crash is or is not to be the cause of serious injury to the occupants of the cabin.

There is no reason to expect that personnel can be improved over night. The natural qualifications and the technical skill of typical transport pilots of the present day is almost beyond reproach. Certainly no substantial improvement in their inherent capacity is to be hoped for. More cannot be expected from human beings.

Ground facilities are in most cases excellent, although in some instances marked improvement is possible and desirable there, especially on some of the passenger routes recently organized. That again takes time and money, and steady progress is being made in bringing the existing routes into line with the most advanced state of such knowledge.

There remain the general organization and the definition of company policy. It is there, more than anywhere else, that immediate improvement can be sought. New types of equipment cannot be developed in one month nor in six. New pilots cannot be trained, even if we were to discover better ways of training them, in less than two or three years. Operating policies can be determined and put in force almost overnight, and when wise changes are made they can act with magic rapidity both upon the morale of the organization and upon its record for reliability and safety.

In the determination of general policy there are two questions which assume over-shadowing significance. Directly or indirectly, they form the burden of almost every discussion of safety and how it is to be secured. How far should the elimination of hazards be compromised in the interest of regularity of service? How much responsibility should the pilot sustain, and how should the burden of fundamental decision be divided between the man in the air and a controlling official upon the ground?

The first question demands extended and separate treatment and will, in due course, receive it. For the present we pause only to warn against the answer to which impulse will perhaps move the average reader, a categorical "not at all."

There is not the slightest doubt that the safety of air lines could be enormously improved if they ran only under perfect conditions. This same observation holds good for railways, and steamships, and motor buses. In practice the line must always be drawn somewhere. There are many routes on which 50 per cent of the trips are now flown in the face either of conditions actually slightly imperfect at the time of departure or of a forecast that they may probably become so somewhere along the route before landing. To eliminate all those trips would reduce the hazard very substantially, but it would also reduce the traffic to near zero. There

is a limit to the degree of unreliability that patrons will tolerate on any terms.

Put that aside. We shall return to it later. We are at present interested in the second question.

That too divides itself into two parts. Consider the situation of a pilot about to start a trip. He has all the information that can be given him. He holds in his hand the latest weather reports to be compiled. Conditions ahead are doubtful. Shall he go or not? Who is to decide?

Suppose he goes, and after an hour of flight he runs into weather desperately thick, or has a radio report that the next collection of meterological information shows an increasingly pessimistic outlook. Shall he go on or turn back? Again, who is to decide?

Upon one thing all services except military ones in time of war agree. The pilot should never be ordered to take off or to keep on against his will. The man who is persistently unwilling to go when others of greater experience and of proper conservatism adjudge it safe may ultimately be eliminated for incompetence or for cowardice, but he is not forced into the air.

So far there is unanimity. Upon the converse, the advisability of ordering the pilot to stay on the ground when his disposition would be to fly, or indeed of giving him any orders at all, diversity of opinion is rampant.

The military services have given the ground officers the final word. In the army, and to a somewhat less extent in the navy, the officer in charge of flying on the field is supreme in time of peace. The pilot may be a colonel and the officer in charge a first lieutenant, but the plane cannot leave without a clearance. The pilot has no option. The regulation is contrary to general military practice, but it has proven itself wise. We favored its extension three or four years ago, and we approve it now.

Commercial air lines are in a different position. Their object in selecting pilots can be more specialized. The personnel can be picked almost exclusively for conservative judgment and perfection of technique. The object to be sought is the imbuing of the organization with a conviction that safety is preeminent, that the pilot who acts to insure it will always receive the approval of his employers, that recklessness will never be tolerated, and that there is no place for the up-and-at-'em boy who tries to outdo his fellows in getting through. With the right spirit instilled, the rest can be left to the pilot.

In the air it must be left to the pilot. There is no parallel between a locomotive, running upon fixed rails and governed by a block-signal system, and an airplane. Conditions in the air are too variable to be intelligently interpreted from the ground. The decision upon whether to go on or to turn back can only be taken by the man on the spot. He should be given, by radio, all the information that exists. He should be free to call for special help if he wants it, but the final decision must be his alone, precisely as for the master of a ship at sea. The case of the Vestris offered some ugly hints of what may happen when a commander afloat (or in the air) begins to receive instructions from an office ashore.

The case is not so clear before departure. The pilot who is competent to reach a decision in the air ought to be competent on the ground as well, but at present we are dealing with an established condition that cannot be suddenly amended. Wise, sober, and conservative judgment are not yet universal. Ground supervision of the pilot's decisions may be judicious, if not necessary.

We accept it and recommend it as the best means of weeding out the temperamentally unfit from the operating personnel. In the air the pilot's decision is the only one. Before the take-off let his be the first decision, but let it be subject to check. When the pilot declares himself ready to go, someone,—not Mr. Brisbane's "solemn person not a pilot," but someone with long flying experience,—should have the right of veto. And about the second time that veto has to be interposed there should be an opening for a new pilot, for the man who is willing to start a flight unwisely is equally likely to keep on unwisely after starting, when there will be no check on his judgment except the check of disaster.

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Billboard Publicity

AIR TRANSPORTATION, as expressed by air line operation, is still the bread and butter of the aviation industry. In our enthusiasm, we are prone to envisage future possibilities to tickle the palate of a gourmet, while neglecting many of the more prosaic opportunities of the present.

The men who are giving of their time and resources to increase the interest of the younger generation through glider development, airplane model contests, and aviation clubs deserve admiration and commendation. The attempt to interest all the public in aircraft shows by entertaining them with musical reviews and "traveling troubadours," has a serious purpose in view. Yet we ought never to neglect an appeal to the man or woman of financial resources who may be interested in air transportation as a straightforward business proposition. In fact, it may even sometimes be reasonably feared that some of our more spectacular propaganda activities exert an unconscious negative influence on the most important class of prospect now in view.

Since air transportation is the keystone of our aeronautical progress arch, it might be well to concentrate upon it more directly. Much has been done by judicious advertising in newspapers and magazines—more can be done.

However, there has been one major force in our modern industrial age which has been almost neglected. Consider the commonplace billboard. Regardless of our esthetic reactions to its more virulently eye-searing manifestations, we are forced to admit its practical utility in publicity work. Our personal acquaintance runs to only three large cities in which it has been employed to any considerable extent in behalf of aviation.

Suppose some authentic aviation organization of national repute were to foster the preparation of a set of really attractive aviation posters, which would be as much of a scenic asset as any billboard can. In one corner would be left a blank space where information concerning the departure and designation of scheduled transport planes would be locally inserted. Let the air transport organizations of any city enlist the cooperation of their chamber of commerce or board of trade to secure available bill-posting space well located. The result would be a formidable air transportation campaign whose cost would be nominal.

The roving eye of the visitor in the city, who is inevitably a traveler, and whose time has some monetary value, would be attracted by the signs. The salesman or traveling representative, most nearly exemplifying the traditional being who reads as he runs, would be vitally interested in "Planes leave every day for Washington, Philadelphia and New York at 1 p.m.—For Pittsburgh, Cleveland, etc., at 11 a.m." From his train window as he enters the city, from his taxicab window or as he hurries along the street afoot, the posters would hammer home their message.

Sooner or later, the reader would take that first air trip, which is what all our educational activity is aimed at. Once we have his foot off the ground, our first victory is won. It would be one of the most practicable ways of bringing air transportation forcibly home to the traveler, who as a stranger often has neither the time nor the inclination to read the local papers. If the billboard can advertise the United States of America to advantage, as evinced by the recent "Forward America" poster campaign, certainly it can bring genuine and legitimate aid to aviation.

//

Esprit de Corps

SAFETY is the first consideration in operating an airline. Reliability, economy, consideration for the convenience of patrons are all important, but all must take secondary places until a reasonably satisfactory measure of safety has been assured. Fortunately, if all those qualities are considered in a broad light there is no conflict between them. Economy in air transport is not to be found in elimination of safeguards or in reckless and arbitrary reduction of personnel, but in the suppression of waste. A wasteful organization is not only expensive, but slack and therefore dangerous. An unreliable line in nine cases out of ten is making a bad record not because of unwillingness to fly in dangerously bad weather, but because of inadequate equipment, ground organization, or meteorological information service. To set a high standard of efficiency in performance is, as surface transport interests have long since discovered, one of the best assurances of a good record of freedom from accident.

Neither safety nor reliability, and not even economy except in a very limited way, can be insured by promulgating fiats from the executive offices. An air line is an inherently decentralized organization. King Canute behind the mahogany desk may bid the waters of expenditure and of accident loss to roll back, but without something much more than passive obedience on the part of his subordinates the tide will continue to rise.

One little phrase describes the raw material of success in air transport. It stands as the caption of this editorial. The greatest military leaders of all the ages have been great because they sedulously cultivated it. To an air line as well as to an army, its presence means success and its absence failure.

Esprit de corps grows from within. It is the embodiment of the realization by every member of the organization that he is engaged not only in earning a weekly wage or a yearly salary but in rendering a great public service. We shall never get satisfactory results unless every individual member of the organization feels a genuine responsibility for the organization's performance and a genuine pride in its achievements. Air transport has no place for clock-watchers at any price.

Pride in himself and in his organization! There is the keystone. The spirit must develop by gradual growth, but much can be done to encourage it.

One very helpful measure is the proper use of uniform attire. When uniforms were developed and adopted for armies and navies, it was only incidentally so that the friendly forces might be distinguished from the enemy. The uniform had a deeper purpose in symbolizing the organization's common purpose and common soul.

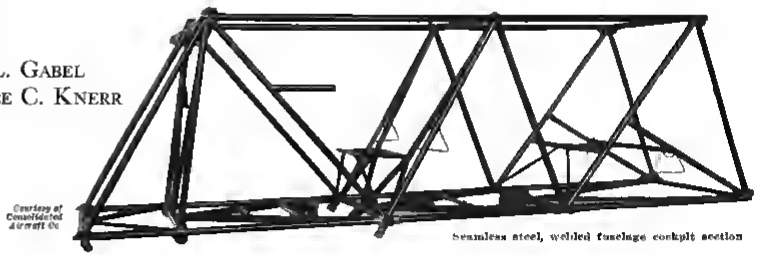
It has the same purpose today for an air line, but to serve that purpose it must be respected. Most of the leading air lines now provide uniforms. In a few cases one might suspect that the object had been to spare the pilot the expense of a suit of overalls. We have seen uniforms that were faded and greasy, with buttons tarnished or missing entirely. We have seen pilots in winter wearing blue uniforms surmounted by tweed overcoats. We have seen uniform headgear replaced by golf caps. In an organization where such things can occur something of the hoped-for spirit is lacking. A complete lack of uniformity of attire is better than the travesty presented by some heterogeneous mixture of garments. It may seem a little thing, but it is the visual evidence of the attitude of the pilot towards his service and towards the passengers who must be his first consideration. A little thing,—but a vitally important emblem of a very great one.

THE STORY OF *Aircraft Tubing*

The First of a Series of Three Articles on the History and Characteristics of Steel Tubing

Horace C. Knerr

By S. L. Gabel
and Horace C. Knerr



Courtesy of Consolidated Aircraft Co.

Seamless steel, welded fuselage cockpit section

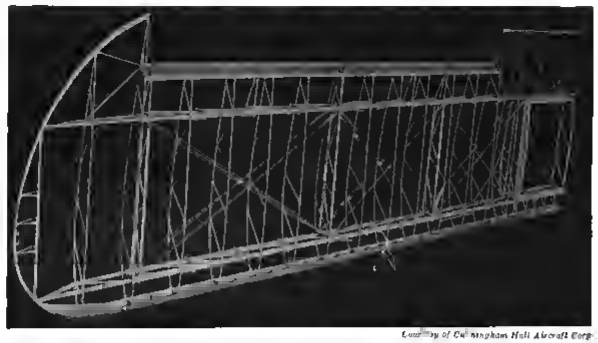
Aircraft tubing has played, and continues to play, a major part in the construction of aircraft. Present-day construction style is toward rather than away from it. The president of the Summerill Tubing Company, Bridgeport, Pennsylvania, is S. L. Gabel, and his company has done much to advance the seamless tubing trade. Horace C. Knerr, serving as consulting engineer to Summerill, is best-known to the aircraft industry as president of Metlab of Philadelphia, Pennsylvania, where he is undertaking extensive research on metals for airplanes. Herewith is presented the first of a series of three articles by these two which should be of interest to those who fly as well as to those who build the planes. The complete history and characteristics of tubing are set forth in a clear and concise manner.

NATURE learned by experience that structural materials arranged in tubular form afford the greatest strength and stiffness for a given weight. Bones and quills are tubular. Man learned the same thing by engineering methods. Therefore, the bones of aircraft, the skeleton parts which give the structure its support and strength are today made principally of seamless steel tubing. In addition to its superiority from the design standpoint, steel tubing has outstanding advantages for the shop man. It can be readily cut, formed and bent into desired shapes, and is easily fitted and joined. While the theoretical advantages of tubular members apply principally to parts carrying compression, bending or torque, the tubular section has practical advantages for use in tension members, because of the readiness with which efficient joints can be made. A tube is ideal for the truss type of construction, where the members must carry tension or compression alternately, as well as bending.

Steel tubing may be joined by various methods including welding, brazing, riveting, bolting and soft soldering. Each method has its place. More than 90 per cent of the work in this country is done by oxyacetylene welding. Tubing is very well adapted to joining by welding, as it is only necessary to make a fairly accurate miter and complete the joint with weld metal. Where joints are made by riveting, it is usually necessary to provide clips or fittings for conveying the stresses from one member to another. Some manufacturers, notably the British, have developed this method in very ingenious ways. Riveting has the advantage that parts can be heat treated before assembly, when heat treating after assembly is impracticable, as in a large fuselage.

Recently the Cunningham-Hall Aircraft Corp. has constructed steel wing beams of heat treated alloy steel tubing joined by means of bolts. The chrome molybdenum steel tubes are heat treated in long straight lengths to a tensile strength of 140,000 lb. per sq.in. The remarkable characteristics of chrome molybdenum steel permit drilling and other machining to be done in the heat treated state.

The wing beams illustrated in figures *A* and *B* are those of the Curtiss Condor, type B-20. The chord members are chrome molybdenum steel tubes drawn to elliptical section and heat treated in straight lengths to a tensile strength of 140,000 lb. per sq.in. The lattice members are round tubes of the same steel, for which normalizing gives sufficient strength. The beams are made up by welding. The heat is confined close to the point of junction and does not affect the middle third of the span sections where the stresses are high. In the Curtiss King Bird, the wing beams were of similar design but the parts were welded together in the annealed state and the beams then heat treated in sections. This practice is believed to be preferable.



Courtesy of Cunningham Hall Aircraft Corp.

All metal wing structure. Beams are of chrome-molybdenum steel tubing

The successful and economical use of steel tubing in the construction of aircraft wing beams has been made possible by the development of vertical electric furnaces for heat treating either the tubing or the beams to high and uniform strength without distortion. Beams comparing favorably in strength and lightness with those of wood have been produced.

Axles and other parts of landing gear have been made of heat treated alloy steel seamless tubing for many years, as they are subject to the most severe stresses and shocks. Three and one half per cent nickel steel was formerly employed, but has been superseded by chrome molybdenum steel. Engine mounts are a more recent field for heat treated steel.

THREE principal types of steels are used in aircraft today. The earliest efforts to adopt steel were made with the ordinary commercial grade, commonly referred to as cold rolled steel or cold drawn steel, having a carbon content of approximately 0.10 to 0.20 per cent. This material is easily worked, either hot or cold, and can be cold drawn to a tensile strength in the neighborhood of 60,000 to 70,000 lb. per sq.in., with a fairly good elongation. However, in brazing, welding or hot forming this steel the strength increment introduced by cold working is removed, leaving the material in the fully annealed condition, where its strength may be as low as 40,000 lb. per sq.in. This was inadequate for even the earliest military craft. Specifications were therefore revised by the Army and Navy to call for steel having a carbon content of 0.20 to 0.30 per cent, known as steel No. 1025. This steel, after the heat of welding, etc., retains a tensile strength of not less than 55,000 lb. per sq.in. Its working and welding qualities are practically as good as those of the low carbon steel.

Either of the foregoing steels is a "heavy" metal of construction because of its low strength-weight factor. Commercial steel is still used by a few aircraft builders, perhaps through a mistaken idea of economy. Steel No. 1025 is employed where the determining factor is modulus of elasticity and not strength. Its greater mechanical accuracy, uniformity and reliability make it preferable to the commercial grade, aside from its physical properties. Chrome-molybdenum steel No. 4130X is well on the way to displace both and is today virtually the standard material of construction for aircraft in this country. The danger of mixing No. 1025 steel with No. 4130X steel in stores or during fabrication has led many manufacturers to abandon the former

altogether, using only No 4130X steel throughout Chrome-molybdenum steel was carefully studied by the Army Air Service and was found to possess remarkable properties It can be cold drawn to the very thin walls required in aircraft construction, can readily be bent or formed to desired shapes hot or cold, has excellent welding characteristics and retains a relatively high strength after being subjected to the heat of welding Furthermore, it responds exceptionally well to heat treatment, developing physical properties better than ordinarily expected of an alloy steel of similar or comparable

Axles of beal type for Army bombers Telescoped in three sections for lightness Joints fishtailed and welded. Heat treated to 180 000 UII

Table I—Typical Strength-Weight Factors* of Aircraft Materials

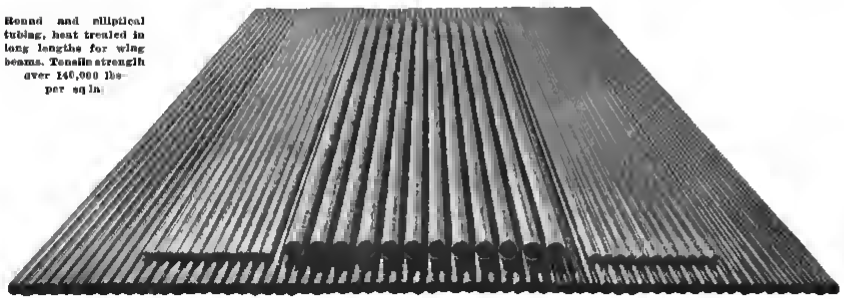
		S. W. F.
Wrought Metals (Tension)		
Music wire—0 01-inch in dia	400 000 7 85 =	51 0
Alloy steel, heat treated high	200 000 7 85 =	25 0
Alloy steel—heat treated medium	150 000 7 85 =	19 0
Duralumin	55 000 2 85 =	19 0
Magnesium alloy	34 000 1 75 =	19 0
Alloy steel—normalized	95 000 7 85 =	12 1
Mild steel—normalized	55 000 7 85 =	7 0
Low carbon steel—commercial	40 000 7 85 =	5 1
Aluminum—annealed	12,000 2 7 =	4 4
Wood (compression)		
Balsa	2 200 0 12 =	18 0
Douglas fir	8 000 0 54 =	11 0
Spruce	4,300 0 43 =	10 0
Oak white	5 900 0 74 =	8 0

*Obtained by dividing ultimate strength in thousands of pounds per square inch by specific gravity

carbon and alloy content After heat treatment this steel may be machined more readily than other alloy steels of the same strength and hardness

When comparing structural materials for aircraft, it is necessary to take into consideration both the weight and the strength A simple means for doing this is to divide the strength by the specific gravity of the material, obtaining a number which may be called the strength-weight factor A material having a high strength-weight factor is a lighter material of construction than one having a low strength-weight factor Some typical strength-weight factors are given in the accompanying table It will be seen that alloy steel when heat treated to a tensile strength of 150,000 lb per sq in is equal in lightness as a material of construction to duralumin This does not take into consideration savings in weight possible by welding steel as compared with riveting duralumin joints Steels which are heat treated to a higher strength than 150,000 are "lighter" than duralumin Good chrome-molybdenum steel may be readily heat treated to a strength of 200,000 lb per sq in with a yield point of 170 000 or over and an excellent ductility and toughness When correctly treated it is not brittle and has a high resistance to fatigue

NEARLY ALL steel used today in aircraft is made either by the open hearth or the electric furnace process By means of the electric furnace, steel of the very highest quality can be produced The impurities such as phosphorus and sulphur can be held at extremely low limits and the various inclusions and particles of slag and sand commonly known as "dirt", can be kept at a minimum thus contributing to high endurance under repeated stress Steel of very good quality can also be produced in the open hearth furnace. While this steel does not have the exceptionally fine properties of electric furnace steel properly made it is quite satisfactory for most structural parts Electric steel is made in furnaces ordinarily having a capacity of three to ten tons, heated by means of the electric arc The temperature can be accurately regulated, the contaminating effects of fuel are avoided, the steel can be held for any desired settling period to free it of non metallic inclusions and the chemistry of the process can be closely controlled The relatively small quantity of metal handled contributes to the quality of the produce. The open hearth furnace usually has a capacity ranging from 25 to 100 tons or more The metal is melted in a large shallow basin by means of intense heat applied from above,



Round and elliptical tubing, heat treated in long lengths for wing beams. Tensile strength over 140,000 lbs per sq in

under the arch of the furnace, the fuel being oil, gas or tar. Under either process, the skill and care of the steel maker is a very important factor in determining the quality of the finished product Chemical analysis and physical tests by themselves are no guarantee that steel will give the desired service When the melting reactions have been completed, the molten metal is tapped from the furnace into a ladle, from which in turn it is poured into cast iron ingot molds and allowed to solidify From these it is removed in the shape of square, hexagonal, octagonal or corrugated ingots weighing from about one-half to several tons The upper and sometimes the lower end of the ingot contains a considerable quality of impurities and internal defects and is therefore cropped off and scrapped The remainder of the ingot is supposed to be sound and homogeneous but it is here that the most serious defects in steel often occur Unless great care and skill have been exercised by the steel maker, this part of the ingot may have cavities along its axis, known as "pipe", due to shrinkage; blow holes scattered through its mass due to entrapped gases; cracks and other defects in its outer surface, due to various causes, and great numbers of small non-metallic inclusions referred to as "dirt" scattered through the metal Moreover, the composition may very greatly from core to surface and from top to bottom, due to segregation of the chemical constituents It is in freedom from these defects that the better grades of steel many times repay their moderately higher cost

Corner of raw stock warehouse Hot rolled tubes being cut in half and pointed preparatory to cold drawing Forge and hammer for pointing at left.

THE INGOT is hot worked by rolling, pressing or forging into a bar possibly 3 to 5 in. in diameter and 10 to 20 ft. long Hot working not only shapes the material but also greatly improves the character of the metal by breaking up and refining the coarse grain which resulted from the slow solidification of the ingot

These long bars or tube billets are the raw material for the piercing mill They are cut into short sections by means of a high speed cutting disc and heated in a furnace to a high temperature for piercing The hot billets are introduced into the piercing mill, which consists essentially of a pair of conically shaped rolls, so arranged that, in passing between them, the billet is rotated and at the same time moved forward, while being subjected to pressure from the rolls This results in producing a somewhat irregular opening along the axis of the billet A piercing point, consisting of a hard heat resisting steel point mounted on the end of a rod, is pressed against this cavity as the billet is moved forward and the hole is thereby enlarged and rounded

The inside and outside of these crude tubes are very rough and are spirally grooved due to the piercing operation. The length is increased but the outside diameter is not greatly changed The pierced billet, still hot, is threaded over a rod or mandrel and rolled longitudinally between grooved rolls The length is much increased and the diameter moderately reduced in this process and the walls of the tube are made thinner and smoother Next, the hot tube may be passed over another mandrel and rolled circumferentially, further reducing its diameter, increasing its length and making it more accurately round

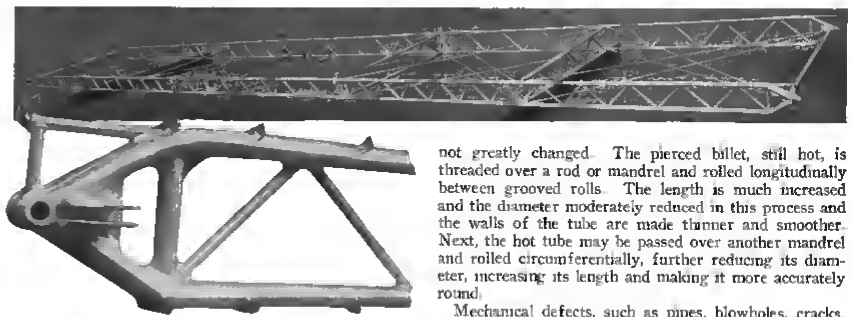


Fig A Wing beams of Curtiss-Condor Fig B (Insert): Close up of the end of one of the beams.

Mechanical defects, such as pipes, blowholes, cracks, etc, which were present in the ingot may possibly be welded shut during one or more of the hot working operations On the other hand, such defects often remain in the metal, becoming flattened and greatly elongated as working proceeds and resulting in so-called "seams" and laps in the tube The piercing operation may produce folds and slivers in the metal which are flattened out, but not removed, during subsequent rollings

For structural parts of aircraft and where accuracy of dimensions without final machining or grinding is required, or where special shapes, thin walls or small diameters are called for, the tubing is cold drawn Some hot rolled tubing is used for engine parts, notably for cylinders, bushings and the like, being of course, machined

AIR TRANSPORTATION AND ITS Legal Problems

By Brice Clogett
McAdoo, Neblett, O Connor and Clogett

THE ENORMOUS STRIDES made in air transport work have brought to the front highly important legal and economic problems which should be discussed and solved intelligently in order that mistakes may be avoided which for generations hindered and retarded the development of the railroads of the country

Two of these problems may be briefly stated as follows

(1) Should there be regulation by the Federal or State Governments, or both, of the rates for carrying passengers, freight and express by airplane, and if so, what form should this regulation take?

(2) Should the carrying of the United States mail by air transport continue to be dealt with through contracts between aviation companies and the Postoffice Department, or should the air mail be treated in the same way as railway mail is now treated?

These questions are not merely abstract legal problems They vitally affect the success or failure of what is rapidly becoming one of the largest industries of the country They have no bearing upon the use of airplanes by individuals using their own planes for business or pleasure, but they vitally affect the very rapidly growing business of the use of aircraft as common carriers—transportation through the air for hire of passengers, mail, freight and express

Brice Clogett

There can be no possible doubt that the next few years will see an enormous increase in the amount of freight express matter, mail and passengers which will be carried by air transport To just what extent traffic will be taken away from the railroads is problematical and is no part of this discussion It is sufficient to point out that the farseeing railroads have already realized the inevitable and are making arrangements to co-operate with air transport companies for the joint movement of passengers, mail and express, and that this co-operation naturally will extend to at least the lighter forms of express and freight traffic needing expeditious movement

Up to the present time both Federal and State aeronautical legislation and the comparatively few Court decisions have no bearing on rates or charges (except as to air mail) but have related primarily to air sovereignty and the licensing and inspection of airplanes, pilots, air routes and landing fields

Recently, however, bills have been introduced in Congress proposing regulation of air transport rates by the Interstate Commerce Commission and it appears certain that other regulatory legislation, both Federal and State, is certain to be wisely discussed The intent of such proposed legislation is to treat air transport in much the same way that railroads have been treated in the past

The relationship between railroad regulation and air transport regulation is closer than might appear on the surface. A large proportion of present airplane transportation, especially of passengers and mail, is carried on by joint arrangement between railroads and air transport companies This is due partially to the fact that very few passengers so far desire to ride in airplanes at night and, therefore, the night portion of long journeys are made by train In connection with the mails, airplane service has been devoted almost wholly to movements between the larger centers and, therefore, much of the air mail to points not on air lines is transported by train In addition, there is a close analogy between railway and airplane transport, in that both legally are common carriers over fixed routes

THE HISTORY of railroad legislation illustrates how far the pendulum of public opinion may swing between helpfulness and oppression Just as now, legislators and the public are particularly anxious to do everything possible to help aviation, so, in the beginning of the railroads, they received general, public and legislative support Many of the first railroads were constructed by public grants from the Federal or State Governments and Municipalities of lands or actual cash Later, and as a result, in part at least, of the iniquities of many railroad managements, legislators and the public began a period of repressive regulation The middle ground, strict regulation, combined with encouraging help, finally came in the Transportation Act of 1920 This law requires the Interstate Commerce Commission to initiate such rates for the carriers as a whole, or by rate territories, as under efficient management would yield as nearly as might be a fair return upon the aggregate value of railroad property

The Act also empowered the Interstate Commerce Commission to see that intrastate rates were not so low as to create a burden upon interstate commerce Prior to the war, the theory had been that the more competing railorads were constructed the better for the public interest The new law proceeded upon a new consideration, that it was a disadvantage for the public to have more railroads than were needed to handle the needs of the country and to afford a reasonable amount of competition The result was that the law provides that no new railroad can be constructed except upon the issuance by the Interstate Commerce Commission of certificates of public necessity and convenience The new Act also authorizes pooling when found by the Interstate Commerce Commission to be in the public interest and specifically empowers the Commission to authorize combinations Under the law, carriers affected by such orders of the Commission would be relieved from the operation of both the Federal and State Anti-trust laws

A new departure in the Transportation Act of 1920 was to authorize close supervision by the Commission over the issue of stocks, bonds and other securities by the railroad companies

With respect to air transportation, some of the lessons taught by railroad regulation have already been embodied in Federal and State legislation, but it is clear that only a beginning has been made

Probably it will be generally agreed that the relative authority of the Federal and State Governments with regard to transportation by air is approximately the same as with regard to railroads Both are derived from Section 8, Article I of the United States Constitution granting to Congress power "to regulate commerce with foreign nations and among the several states . . ." Article X provides that, "the powers not delegated to the United States by the Constitution nor prohibited to it by the States, are reserved to the States respectively, or to the people" No constitutional question has given rise to more discussion and resulted in more closely argued cases than the relative jurisdiction of the Federal and State Governments over commerce.

This is not a place for a review of the court decisions which furnish a part of the schooling of all lawyers. It probably is sufficient to refer to the fundamental decision of Chief Justice Marshall in Gibbons v. Ogden and to

Loading mail while the pilot looks over the instruments

With air transport playing an ever-increasing part in American commercial and private life, it would seem altogether advisable for operators to take time out for a careful study and review of American railroad history. The problems which now confront transport operators are rather strikingly similar to the problems which confronted railroad operators. As Mr. Clagett points out in the accompanying article, the way in which the railroad problems were handled, or rather mishandled, proved a hindrance to iron horse development in this country. It is his opinion that if air transport operators permit history to repeat itself, it is quite possible that aeronautic progress will be retarded more than ever.

the words of the Supreme Court in the case of Hall v. Decuir, as follows:

> "But we think it may safely be said that State legislation seeking to impose a direct burden upon the interstate commerce or to interfere directly with its establishment does encroach upon the executive power of Congress"

The basic Federal legislation on aeronautics is contained in what is known as the "Air Commerce Act of 1926" This Act at present contains no provisions as to rates, the issues of securities, competition, or any of the other subjects which have proved so difficult in railroad regulation It does, at the outset, dispose, as far as United States law is concerned, of a problem which at one time promised to be a very difficult one, namely the control over the air Section 6 of the law contains a provision that "the Congress hereby declares that the Government of the United States has, to the exclusion of all foreign nations, complete sovereignty of the air space over the lands and waters of the United States, including the Canal Zone" In addition, the Act gives to the Secretary of Commerce power to designate and establish civic airways and to chart and light them, but provides that no exclusive right shall be given for the use of any civil airway, airport, emergency landing field or other air navigation facility The Act also gives to the Secretary of Commerce the duty of gathering aviation statistics The principal part of the law is that authorizing the Secretary of Commerce to license airplanes and pilots, and, as a safety measure, it is declared unlawful to navigate any aircraft "in interstate or foreign air commerce" unless the aircraft is registered with the Department of Commerce and unless the pilot has an Air Man Certificate from the Department.

MANY of the States have followed the example of the Federal Government by passing laws regulating the licensing of airplanes and pilots and controlling the construction and operation of airports The best of these laws provide for acceptance by the States of the Federal licenses Both the Department of Commerce and a Committee of the American Bar Association have prepared drafts of uniform State laws on the subject Already confusion has begun because of the varying provisions or different State laws on the subject and this confusion promises to rival the confusion regarding railroad regulation unless prompt steps are taken in the direction of uniform state laws

Admittedly, legislation effecting the licensing of planes and pilots is only a beginning Present laws do not specifically affect the financing of airplane companies, control over rates, competition or monopolies, or other problems which have presented the greatest difficulty in railroad regulation General laws both of the Federal Government and of the States probably cover the competition question and State "Blue-Sky Laws," where they exist, undoubtedly apply to aviation company securities, but, except with respect to railroads, there is no Federal security law and no Federal or State agencies have as yet been set up with the power to regulate rates and service of transport by air

While some of the bills introduced in Congress have proposed that the Interstate Commerce Commission be given jurisdiction over air transport, in addition to railroads, there apparently exists a general feeling that the Interstate Commerce Commission is already overburdened with work and that if there is to be Federal regulation the task should be entrusted to the Department of Commerce or a new independent Commission Undoubtedly there is danger of any strict regulation having the effect of discouraging investments in the different branches of the airplane industry It is an "infant industry" and, therefore, needs encouragement rather than repression It is chiefly for this reason that all proposed regulatory legislation must be most carefully scrutinized and particular attention paid to the opinions of Government officers who have had long experience in dealing with aviation activities

The question is whether air transport rates and service and securities are to be regulated, and if so how Everyone objects to being regulated and, therefore, the natural position of the transport companies is to say "let us alone." That is exactly what the railroads said, and their fight against regulation almost ruined them. Perhaps it would be better for the air transport companies while everyone is sympathetic toward them, to agree on liberal and proper regulation for the protection of themselves and the public

The development of the air mail appears likely to follow in general the history of the railway mail and, therefore, this history is important to persons contemplating investments in air transport companies, as well as to the general public using the mail

WITHOUT DWELLING upon mail history, it is sufficient to say that the Act of Congress approved July 7, 1838, constitured every railroad in the United States a "post road" and this situation continues under existing law For many years after the mails began to be carried by the railroads, arrangements therefor were contained in contracts between the Postmaster General and the individual railroads in much the same manner as the air mail is now contracted for by the Postmaster General in accordance with the Acts of Congress approved February 2, 1925, June 3, 1926, and May 17, 1928 Subsequently, the system of railway mail contracts was in general abandoned and the Postmaster General shipped mail over practically all important railroads as common carriers, the compensation of the railroad being fixed by Congress As a result of long agitation, due largely to the claim of the roads that they were not being paid a compensatory rate, Congress, by the Act of July 28, 1916, conferred upon the Interstate Commerce Commission power to determine fair and reasonable rates and compensation for the transportation of the mails by railroad common carriers, the Commission to prescribe the method, or methods, by weight and space, or both, or otherwise, for ascertaining the rate of compensation

Speaking generally, all the principal railroads of the United States carry the mails and are compensated on the same basis Previously, under the Act of March 3, 1873, the railway mail compensation was on the basis of a rate per mile, per annum, according to the average daily weight carried on each route, the weight being determined by weighing the mails for not less than thirty consecutive working days and at least once every four years (report of Joint Congressional Committee, August 31, 1914, page 59), but at present, and in accordance with the last railway mail pay decision of the Interstate Commerce Commission, decided July 10, 1928 (144 ICC 675) the compensation to the railroads is on a rate per mile, according to the authorized *space* allotted to the mail carried on the route. This compensation for the larger railroads runs from 4 50 cents a mile for each three foot closed-pouch space to 39.39 cents per mile for each sixty foot railway postoffice car The minimum payment on any mail route for the larger railorads, over any part of which mail is distributed not less than six days a week, is $72 per mile per annum

The air mail was first carried directly over limited routes by the postoffice department in Government planes, but under the present law, the air mail is moved under contracts made by the Postmaster General with private air transport companies Such contracts under the law may compensate the private companies at not to exceed $3 per pound for air mail for the first thousand miles and not to exceed 30c per pound additional for each additional one hundred miles, or fractional part thereof, for routes in excess of one thousand miles in length In practice, the contract rates received by the private companies run from 67c per pound to $3 per pound

UNDER existing law air mail contracts are awarded by the Postmaster General upon competitive bids The practice is for the Postmaster General to lay out the proposed air mail route, to advertise for bids and to award the contract, not necessarily to the lowest bidder, but to the lowest *responsible* bidder, consideration being given to financial soundness and capacity in determining responsibility. Contracts run for a period of four years At the discretion of the Department, following two years of satisfactory operation, a certificate may be issued to the contractor for eight additional years, but the Department may, as a condition of the issuance thereof, revise the contract price downward to what may be agreed upon between the contractor and the Department as a fair price If the parties cannot agree on a revised rate, the contractor may refuse the eight year certificate and operate under his original contract until its expiration. The contractor is not required to begin operations until airway aids to navigation have been installed by the Department of Commerce.

One fact not generally recognized is that in addition to the provisions for carrying the "air mail" (that is mail on which a 5c stamp is now required) the law permits the Postmaster General to make contracts for the transportation by aircraft of first class mail other than air mail (that is mail on which a 2c. stamp is now required) at fixed rates per pound, including equipment,

A shipment of air freight stored aboard a transport

not exceeding 60c per pound for the first thousand miles and not to exceed 6c additional for each additional hundred miles, or fraction thereof, for routes in excess of one thousand miles in length

IT WILL BE SEEN from the above outline of existing conditions that the present outstanding difference between the railroads and air transport companies with respect to carrying the mails, is that practically all railways carry the mails, at least to some extent, whereas no air transport company may carry the mail unless it first makes a contract with the Postoffice Department The railroads which are closely competitive each carry the mails but so far the Postoffice Department has not made mail contracts with airplane companies on competitive routes This policy has been followed largely to encourage existing companies, but one problem is how long this condition will be continued and what assistance from revenues from carrying the mails may be obtained by companies desiring to establish airplane routes primarily for the transport of passengers and express, or freight. A subsidiary but related question presents itself with regard to express because, since the introduction of parcel post, packages may be carried as fourth class mail matter, weighing as much as 11 lb, although, at the present time, only first class mail is carried by airplane.

The competition, however, between the air mail service and the railway mail service goes much deeper than the relative cost So far as the methods of handling the mail are concerned, the air mail service has hardly begun to compete with the railway service At present the air mail operations are almost totally confined to carrying bulk mail in sacks between the larger centers of population, although on most of the present contract air mail routes some intermediate stops are made and mail for those points discharged The mail thus discharged is then redistributed by the usual methods without assistance from the air mail

The railway mail service, however, is much more highly developed In addition, to performing the kind of service as is now carried on by the air mail, there exists on most of the railway postoffice cars a compartment car devoted in whole, or in part, to the mail service and manned by railway mail postal clerks On these cars the mail is sorted en route for distribution along the line of the railroad, and in some cases the mail is handled in such detail on the railroad postoffice cars that it goes directly, at destination, to the homes by carriers without rehandling in the local postoffice.

Perhaps it is too early and would not be beneficial for any one interested in the future of transportation by air to attempt to lay down inflexible rules or make definite proposals as to how the air mail should be handled in the future, or as to the method, if any, of regulating the securities, service and charges of air transport companies Probably it is sufficient to outline the problems Some of them are immediate They deserve the best thought of government agencies, the air transport companies themselves, and the public generally Their proper solution, along with a settlement of the many technical questions of aeronautics will go far to make the future of air transport in the United States secure. The object of all should be to encourage air transport development, not hinder it The mishandling of the problems as the railroad regulation problem has been mishandled may slow up the progress of aviation and interrupt and minimize the truly marvelous developments since Lindbergh landed at Paris

Newspapers AND AIRPLANE

A Member of the Industry Defends the Policies of the Press, and Better Cooperation Be Afforded the Newspaper

YOU PICK UP your morning paper and with your matutinal eggs and toast are served the news that "EIGHT PERSONS ARE KILLED IN AIRPLANE CRASH." That statement stretches for eight columns across the top of your paper in bold-face type. You as many of us, in the aviation industry, shudder and on not rare occasions permit a flame of malice for the press to rise in your breasts. This is because you are inclined to feel the newspapers are treating us unfairly in playing up airplane accident stories.

Countless submitted editorials by aeronautical executives have been printed in aviation magazines taking newspapers and reporters to task for the manner in which they have handled stories on various crashes. Statements issued from the offices of air transportation companies in which the press is scolded are not rare. And it is a common incident to walk up to a group of pilots, or company employees and hear them berating newsgatherers and newspaper cameramen for their actions during some recent accident. The consensus of all these conversations, statements and editorials is that the newspapers are unjust to the aviation industry.

But, is the press of the nation really unfair in the treatment of air accidents?

From an operator in our position one would naturally assume our answer would be "Yes." It would seem quite logical to believe we would side with the majority of other operators who hold that belief. For our company, as well as others has experienced the effect of "crash" headlines in many newspapers throughout the country. But at the risk of appearing to be an abjurer, we are going to take the side of the newspapers. As we feel many of the operators have brought and are continuing to bring the dilemma of "crash" stories on themselves.

Perhaps the position of the newspapers and their reporters can be more clearly understood by first comparing them with an automobile agency and its salesmen.

The primary purpose of the press is to print the news as quickly and correctly as possible. Every paper is always striving to beat its rival to the street with a story. The object of an automobile agency is, of course, to sell cars; and to sell more than its competitor.

Reporters exist because the press wants the news early. The papers cannot afford to wait until Demon Rumor, with his fabrications and inaccuracies, brings in the jumbled details of a story. Automobile salesmen exist that the firms for which they work may also survive. No automobile firm could hope to remain in business long if it employed no salesmen to go out and call on prospective buyers.

Just here the similarity between a newspaper and automobile agency and their representatives ends, however. For the salesman may come back to his employer and offer an acceptable and plausible excuse for not having sold a certain prospect. But the newspaper reporter can offer no excuses. He must get the story, no matter what the cost. To fail in this duty would as likely as not cost him his job. Therefore, lacking proper and authentic information, which a member of the company whose plane has fallen, might give, the reporter must perforce write what he sees, or what some bystander has seen.

Eye-witnesses at best are unreliable, and the sight of a plane falling several thousand feet inspires even the hardiest of us to horror. What then can we expect of an impressionable young reporter who gathers his information from what he has seen and from an even more impassioned eye-witness.

Read any account of an accident as related by a bystander and the very absurdity of it is often pathetic. The probable reason is because it is human nature to seek and love publicity. A man on being interviewed instinctively assumes an air of superiority and pictures himself a hero. Consequently he permits his impulses to run wild and his account of the accident is anything but correct. It is this type of story which is injurious to aviation. And it could be very easily avoided if operating companies followed the policy of assisting reporters in gathering the true facts. Seldom has a newspaper printed a really injurious story when its newsgatherers were given the correct information by a company official. But, unfortunately, all aviation concerns do not follow this policy.

NEWSPAPER MEN will tell you it has been their experience that many aviation executives, in a sense, run to cover in accidents involving their companies, and as a result the newspapers take eye-witness accounts from so-called "authorities" who know nothing about accident causes.

Naturally this is the sort of thing that results in accidents being played up by some papers; for the mystery element produced in these cases by mute executives and officials, and the feverish accounts given by bystanders make for sensationalism in the printed stories.

Gossip, Rumor and They Say, all children of bystanders, are the three things air transport operators have most to fear at the time of accidents. They could, however, be made the least feared if operators took the proper steps to avoid them rather than to avoid newspapermen.

"How did it happen?" is always the first question a reporter asks when he approaches the scene of the accident. And 99 times out of a 100 he receives a gruff "How do we know?" from some company employee who has been instructed to "say nothing." Very often reporters and cameramen are roughly shoved aside and told to clear out. The newspapermen then turn to the first persons who are willing to talk—and there are many of them. As a result a disjointed, inaccurate and injurious story appears in the next editions of their papers.

"What then is the proper procedure; how can this be avoided?" you might ask. Our answer is: Gather the reporters together in one group. Relate to them the actual facts and true causes of the accident. Give as clear and concise an account of the affair as is possible and be speedy about doing so.

Be painstaking in your efforts to describe the affair in detail and in a manner readily understood by the general public, for it is the public which will read the reporters' stories. Simple terms are necessary because, although a reporter is required to have a working knowledge of many subjects, aviation has not yet entered into his scheme of things as generally as have others. Therefore, you can readily understand how easy it is to shroud the accident cases in a cloak of mystery by couching your account in technical terms unfamiliar to the layman. The reporter writes in the simplest form of every-day English; so talk to him in the language with which he is familiar.

We believe we are safe in saying that newspapers have done more for aviation than has the industry itself in the matter of making the public air-minded. How else could Lindbergh's flight to Paris have focused the eyes of the nation on aviation had there not been newspapers to carry accounts of his marvelous feat?

Columns after columns of space were devoted to other transoceanic flights. The story of the Graf Zeppelin's magnificent world flight can for nearly 30 days in practically every newspaper in the country.

Whenever an altitude, endurance, speed or other record has been broken the newspapers have made front page stories of it. Even when refueling endurance attempts reached the point of boredom last summer the press helped aviation by carrying many, many inches of type. And yet, when an automobile set a refueling endurance record run several months ago the public knew nothing of it until the manufacturer came out with announcements of the fact in paid advertisements.

Remembering the co-operation and worthwhile publicity the papers have and are continuing to give aviation, are we right when we say they are unfair to aviation?

In our opinion we are not right in saying they have been unjust in their treatment of accidents. An accident story is news, just as is the story of some outstanding feat. The newspapers have always printed the facts as they found them. And if inaccuracies have crept into some of their stories it is the fault of those of us in the industry.

PERHAPS there is an isolated case here and there where a newspaper has allowed prejudice to influence the actions. This is possible, but it is a pretty safe wager that if the truth were known it was because of some injustice the aeronautical concern affected had done the newspaper. And tracing this even further, it is likely the injustice done the newspaper originated from the actions of an official, which would make the prejudice a personal one.

We have had dealings with many newspapermen and reporters. Not one that we have ever known has been malicious or would write an intentionally derogatory statement about anyone without it being absolutely warranted. There are few professions with a stricter code of ethics for its adherents to follow while in the line of duty. All newspapermen we have known have been pretty square-shooters providing those with whom they were dealing gave them an occasional break. We know of a no more open-minded group of men than they. But, like the rest of us, they are human and, if treated badly, or repulsed in their efforts to perform their duties, they can be just as mean as anybody. Hence, if one makes it a point to treat the reporter fairly, he is bound to do the same for you.

What we have said about reporters holds true for newspaper cameramen. They can offer no acceptable excuses for failure to obtain a picture without fear of losing their job. Newspapers demand much. The photographers, therefore, put forth every effort to get that for which they have been sent. Work with them, give them your co-operation, assist them in carrying out their duties and you will quickly see what really good fellows they are. Deliberately place barriers in their way and they will get the best of you in the long run.

An operator is hurting rather than helping himself and the aviation industry, when he makes a deliberate attempt to hide facts, and, to prevent publication of an account of a crack-up. To keep an airplane accident out of the papers is impossible. And the quicker all of us realize this and help the newsgatherers acquire the correct information, the better it will be for all concerned.

ACCIDENTS

Suggests that Bigger and Better Cooperation Be Afforded the Newspaper Reporter

By
CHARLES A.
RHEINSTROM
General Traffic Manager
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REGULATING *Air Commerce*

ARTICLE VI—ACCIDENTS

The Last of a Series of Six Articles by the Section Heads of the Regulatory Division of the Aeronautics Branch

By PENDLETON EDGAR
Chairman, Accident Board, Aeronautics Branch Department of Commerce

AIRPLANE ACCIDENTS are analyzed in connection with a method developed by a Committee appointed by the National Advisory Committee for Aeronautics. This Committee is composed of members from the National Advisory Committee for Aeronautics, the Army Air Corps, the Navy Bureau of Aeronautics, and the Aeronautics Branch of the Department of Commerce.

A standard method of analysis was created whereby a uniform analysis of accidents could be made in order to arrive at comparative figures. This system has now been in effect for over a year and a half, and in recent comparisons with the Army and Navy accidents, has proven itself extremely successful, and a medium for the intelligent study of accidents and their prevention.

Needless to say, this Department is vitally interested in all accidents, for it has been found possible through a detailed study of their causes to prevent possible recurrence, either by amending the present Regulations in regard to the necessary qualifications for pilot's license or requiring better flying characteristics in certain airplanes.

When a serious accident has occurred, the nearest inspector proceeds at once to the scene in order to collect all the information he can in connection with the crash, including whenever possible the statements of any witnesses. The report includes, besides pertinent information regarding the pilot and plane, a confidential reconstruction of the events leading up to the accident as far as possible, based upon the information obtainable. This report, after completion, is ready for submission to the Accident Board, which consists of two or more competent pilots, an aeronautical engineer, a flight surgeon, a lawyer well versed in air law, and a statistician. It is readily seen that expert knowledge can be brought to cover any contributing factors.

Very seldom is an aircraft accident attributable to a single cause only. For instance, the accident report indicates that a pilot, when coming into land and at an altitude of 200 ft. suddenly discovers that he has allowed the engine to become inoperative by failing to occasionally clear it when coming down from several thousand feet. A good emergency field is within easy gliding distance, but the pilot uses bad judgment and attempts to stretch his glide into the regular landing field. A stall results and another airplane accident has occurred. The question is whether the major cause of the accident was engine failure, carelessness or negligence, poor technique in not keeping the engine clear, or poor judgment in not landing in the emergency field. The accident is then distributed according to the percentage of causation factors, as shown in the accompanying Table of Aircraft Accidents in Civil Aviation.

It can readily be seen that with this definite means of determining why accidents are happening it is possible to point the way toward preventing their recurrence. At the present time, current figures are kept of the number of various makes of planes in operation. This is compared with the number of accidents that have occurred to this make plane, together with the nature of the crash. The result is obvious, taking into consideration the type of flying in which the plane is engaged. Whenever the percentage of accidents become too high, the Department goes directly to the particular manufacturer concerned and then does all in its power to assist him in eliminating the defect.

Another record is kept of the number of accidents in which the pilot is involved. Whenever the same pilot is seen to be having a number of accidents which are attributable to pilot's error, a letter of reprimand is sent the pilot, a new flight test ordered, or in a flagrant case of incompetency the pilot's license suspended, or revoked.

As an example of an accident involving pilot's errors, we cite a typical case. John Doe, private pilot, 12 hr solo, is flying in his airplane at 2,000 ft. altitude, between New York and Boston, when he approaches a heavy bank of fog. The weather is clear behind with many available landing fields, but he proceeds in the face of these bad conditions. His plane is not equipped with the proper instruments for blind flying nor has he had any experience in this kind of flying. Regardless of his lack of training and insufficient equipment, he proceeds into the fog; after a few minutes he becomes lost, more and more confused, and finally loses control of the plane, spinning into the ground. Obviously, this accident cannot be attributed to weather for the cloud bank could easily have been foreseen and avoided. The correct distribution is a combination of poor judgment and technique, that in all probability was directly due to inferior school training.

A large number of crashes indicating lack of proper training reflected back on the pilot's original training, and as expected, student instruction was shown to be inadequate and the greatest contributing group as to kind of flying engaged in. As a result, the conclusions and recommendations of the Accident Board were that the standards of flying schools must be raised. This suggestion was followed and taken care of by an amendment to the Air Commerce Act of 1926, which made it mandatory for the Department of Commerce to examine and rate flying schools upon their request. At present, there are over 35 rated schools and the raised standard of the pilot's primary training is already commencing to be reflected in the lower percentage of accidents attributable to inferior instruction.

Another John Doe with several hundred hours comes to the attention of the Accident Board on account of spinning in as a result of a nose high turn with insufficient flying speed. It is found that this is not his first accident and it is discovered that his record discloses several previous accidents attributable to poor

The method of procedure followed by the Department of Commerce in the matter of aircraft accidents is something which has aroused considerable discussion in aeronautical and layman circles alike. ¶In this article Mr. Edgar relates in detail of the work of the Accident Board in analyzing the causes of aircraft accidents, not with the idea of affixing blame or liability on any particular individual but with the idea of preventing possible occurrences of a like nature in the future.

Cause	Percentage January-June 1928	Percentage July-December 1928	Percentage January-June 1929
Pilot			
Error of Judgment	8 45	12 64	12 37
Poor technique	22 95	29 80	31 12
Disobedience of orders	4 95	2 65	1 56
Carelessness or negligence	6 32	10 12	10 02
Miscellaneous	62	50	47
Total pilot errors	43 29	55 79	55 54
Other Personnel			
Supervisory	35	50	28
Miscellaneous	3 10	1 68	1 55
Total errors of personnel	46 74	57 97	57 37
Power Plant			
Fuel system	5 72	3 78	5 81
Cooling system	57	74	83
Ignition system	4 08	2 48	5 03
Lubrication system	13	30	31
Engine structure	1 29	1 75	2 06
Propellers and accessories	44	56	79
Engine-control system		58	09
Miscellaneous	45		23
Undetermined	4 50	5 55	4 89
Total power plant	16 59	15 74	18 04

Cause	Percentage January-June 1928	Percentage July-December 1928	Percentage January-June 1929
Structural			
Flight control system	86	29	23
Movable surfaces	35	07	11
Stabilizing surfaces			11
Wing struts and bracing	1 09	1 15	1 08
Undercarriage	1 64	1 67	3 44
Wheels tires and brakes	19	85	1 30
Pontoons or boat	03		
Fuselage, engine mount, and fittings	75	07	40
Tail-skid assembly	19	14	
Miscellaneous	23		23
Undetermined		03	
Total structural failures	5 32	4 47	6 90
Handling qualities	44	25	2 16
Instruments			06
Total aircraft failures	5 67	4 72	9 12
Miscellaneous			
Weather	10 23	4 67	5 59
Darkness	1 28	88	56
Airport and terrain	8 72	70	3 32
Other	3 90	3 25	1 41
Total miscellaneous causes	24 13	12 12	11 08
Undetermined and doubtful	6 78	9 48	4 39

Analyses of Accidents in Civil Aviation for 1928 and the First Six Months of 1929

technique A search is made in the Medical Section records to determine, if possible, whether or not the pilot has any physiological or psychological disqualifications that might have played a prominent part in the crash If there is any question, a new medical examination is ordered, with a new flight test, or suspension of license

The terms and their definitions for the purpose of aircraft accident analysis are as follows:

I. *Personnel*—This includes all accidents which can be traced to persons accessory to the operation of the aircraft, either on the ground or in the air. This does not include accidents due to errors or omissions of personnel charged with the design, manufacture, maintenance, or inspection of aircraft

1. Errors of Pilots—This includes all accidents, the responsibility for which rests upon the pilot The pilot is the actual manipulator of the controls or the individual responsible for their correct manipulation

(a) Error of Judgment—This includes all accidents resulting from a decision made by the pilot which was not the best possible under existing circumstances

(b) Poor Technique—This includes all accidents resulting from lack of skill, dexterity, or coordination of the senses in handling aircraft controls, whether traceable to inherent inability to attain such or to infrequent flying, lack of experience in flying, lack of experience in flying under particular conditions, or in the particular type of aircraft (Judgment involves mental activity only for the purpose of arriving at decisions as to the ends to be attained and the general course to be followed Technique is the physical expression of the mental decisions which have been made)

(c) Disobedience of Orders—This includes all accidents resulting from the violation or disobedience of local or general orders or regulations or provisions of law governing the operation of aircraft, such as low acrobatics, acrobatics in aircraft not to be used for such purposes, or any other type or manner of operation specifically forbidden by orders or regulations issued by competent authorities

(d) Carelessness or Negligence—This includes all accidents resulting from the absence of care on the part of the pilot according to circumstances or the failure to use that degree of care which the circumstances justly demand, either on the ground or in the air, such as careless manipulation of the controls of an aircraft, failure to ascertain the amount of gasoline on board before taking off, failure to ascertain the conditions of the instruments, etc

(e) Miscellaneous—This includes all accidents resulting from errors of the pilot not accounted for above

2. Errors of Supervisory Personnel.—This includes all accidents the responsibility for which rests upon individuals other than the pilots who exercise control over the operation of the aircraft, such as navigators, formation section leaders, ground-operations officers, etc.

3. Errors of Other Personnel—This includes all accidents the responsibility for which rests upon other personnel directly concerned with the operation of the aircraft, such as members of the flight and ground crews of the aircraft, aerographers, etc. It does not include accidents due to errors or omissions of personnel charged with the maintenance or inspection of aircraft.

II. *Material*—This includes all accidents resulting from failures of the airplane, power plant, accessories, and launching and arresting devices, whether traceable to materials, faulty design, maintenance, or inspection

1. Power-Plant Failure—This includes all accidents resulting from failure or malfunctioning of the propelling system and all auxiliaries essential to its proper functioning, exclusive of instruments.

(a) Fuel system, (b) Cooling system, (c) Ignition system, (d) Lubrication system, (e) Engine structure, (f) Propeller and propeller accessories, (g) Engine control system (Throttle rod, etc), (h) Miscellaneous, (i) Undetermined

2. Structural Failure—This includes all accidents resulting from failures of the airplane exclusive of the propelling system and instruments, (a) Flight control system, (b) Movable surfaces, (c) Stabilizing surfaces, (d) Wings, struts, and bracing, (e) Landing gear (This includes all accidents resulting from failure of the landing-gear struts and shock-absorbing gear, but does not include accidents resulting from failure of the wheels or floats attached thereto) (f) Wheels, tires, and brakes (g) Seaplane float or boat, (h) Fuselage, engine mount, and fittings, (i) Tail skid or wheel assembly, (j) Arresting appliances on aircraft, (k) Miscellaneous, (l) Undetermined

3 Handling Qualities—This includes all accidents resulting from those peculiar characteristics of certain types of aircraft affecting their controllability while on the ground or in the air, such as marked tendency to ground loop, inability to recover from a spin, etc.

4 Instruments—This includes all accidents resulting from failures of instruments which were essential to operation under the conditions of the flight

5. Launching Devices—This includes all accidents resulting from failure or malfunctioning of catapults

6 Arresting Devices—This includes all accidents resulting from failure or malfunctioning of arresting gear not a part of the aircraft

III. *Miscellaneous*—This includes all accidents not accounted for above

1 Weather—This includes all accidents resulting from conditions of the weather which could not reasonably have been foreseen and avoided (Mention may be made on the chart of contributing weather causes, as fog, gale, ice, hail, snow, rain, lightning, etc)

2 Darkness—This includes all accidents resulting from conditions due to nightfall which could not reasonably have been foreseen and avoided

3. Airport or Terrain—This includes all accidents resulting from airports or landing conditions of places which could not reasonably have been detected or avoided (Forced landings should be charged to power plant, etc, unless report shows that a piloting error existed, in which case the crash would be analyzed accordingly)

4 Other—This includes all accidents resulting from causes not otherwise accounted for above

IV *Undetermined and doubtful*

It is emphasized that the only interest of the Accident Board in collecting and analyzing the causes of aircraft accidents is to render assistance in preventing possible future recurrences, and eliminating those causes, and is not for the purpose of affixing blame or liability on any particular individual As a result information in connection with any specific accident is not made public, and is available in statistical form only

THE *All-Wing Type* AIRPLANE

A Description of the New Northrop "Flying Wing"

By JOHN K. NORTHROP
Vice-President and Chief Engineer, Northrop Aircraft Corporation

IT HAS BEEN apparent for several years to the designer of aircraft that some radical changes in general arrangement will be necessary if any large increase in the overall efficiency of the average airplane is to be accomplished

A steady program of development and refinement has been under way for the past twenty years; until we have at present a number of carefully designed and comparatively efficient planes embodying streamline fuselages, carefully cowled engines, and "clean" landing gears; with superfluous struts, wires and fittings suppressed to an absolute minimum. It seems quite apparent that our best designs are close to the limit of practical efficiency; yet we find that their maximum over-all L/D ratio is only about 10, whereas the L/D ratio of the active supporting surfaces of an airplane is normally double this amount

An analysis of the items adding to parasite drag in the normal design shows that landing gear, power plant, fuselage, interference and bracing, and control surfaces are the major contributors to parasite power loss, the item of control surfaces being by far the smallest Individual examination of the various units show that nearly all possible improvement has been made in existing designs

Landing gear retraction offers one of the largest theoretically possible gains, but a tremendous amount of thought has been given to the problem and it still remains essentially unsolved The low wing monoplane offers the best, and almost the only possible conventional arrangement in which a retractable landing gear can be employed, but at best the design of such a gear is exceedingly difficult due to the high loads involved and limited space available for the required mechanism

Power plant drag is a problem that cannot be solved with a conventional arrangement unless the engine is completely housed, liquid cooled, and smooth skin wing radiators are used to dissipate the heat Such installations have proven satisfactory for racing planes, but are far from practical for commercial or military purposes at the present time

The resistance of the fuselage, except in a few rare instances, remains a dead loss, with no possibility of reduction except through careful fairing and streamlining; and often, due to aerodynamic necessity, the size of the fuselage is much less than would be desired from an economic standpoint

Wing surface bracing and interference between the various parts of the airplane comprise one of the largest contributors to parasite drag and the one most difficult to determine Even in the cleanest full cantilever monoplanes, there still remains a large increase in drag due to interference between fuselage, wings, chassis and tail surfaces

And finally, in the control surfaces themselves, we often find it impossible to use even a fairly good aerodynamic form, or to place the surfaces where they are not subject to considerable turbulence and interference from fuselage, wings and power plant

THE FOREGOING considerations and others of similar nature lead W K Jay and the author to the development of an experimental "Flying Wing" type airplane which has been built and tested during the past year and a half, and gives promise, with certain modifications, of solving many of the problems that confront the designer who seeks a large increase in aerodynamic efficiency

The "Flying Wing" in various forms has been a well recognized dream of designers since men began to fly, but it has always been pictured in prohibitively costly and mammoth sizes However, certain comparatively recent developments have made many of its advantages immediately applicable to planes of moderate size Wing sections with maximum ordinates of more than 25 per cent have shown excellent aerodynamic characteristics, and plan form tapers with a root to tip ratio of more than 5 to 1 have qualities equal to or better than a rectangular airfoil The combination of thick sections and large taper at once makes possible a wing structure with central portions of such size as to become economically practical for the purpose of housing power plant, personnel and cargo The structural advantages of such a design are tremendous, and the general arrangement provides ample space for the retraction of landing gear which, while somewhat unconventional has proven entirely satisfactory during actual flight tests

THE FIRST PLANE of this type, recently successfully flight tested, was built primarily as a flying laboratory to test out the various innovations of structure and arrangement of component parts For this reason the plane was designed as small as practicable, while still providing ample room for a pilot and one passenger No attempt to place this particular model in production will be made, the advantages of this type of craft becoming very marked as it is applied to somewhat larger sizes The original plane is all-metal and employs a newly developed type of structure in which the same smooth duralumin or alclad sheets properly reinforced provide both covering and most of the structural strength of wings and tail surfaces This structure is being employed in the design of a new transport monoplane of conventional aerodynamic form which will shortly be placed on the market by the Northrop Aircraft Corp

The all-wing plane which has been flight tested is a thick wing monoplane of high taper ratio, the taper being entirely on the leading edge, in order to balance the plane with engine and pilot in the wing, which results in a marked degree of sweepback The wing has a span of but 30 ft., and tapers from a section of normal thickness and approximately 45 in. chord at the tip, to a chord of 100 in. at the center and a wing section with a thickness more than one-third of the chord As may be seen from the photographs the taper is gradual from the tips to a point about $\frac{2}{3}$ of the distance from tip to center and then increases rapidly to the thick central portion The wings are so mounted with relation to the thickened center section as to give the effect of a center wing monoplane. The inverted air cooled engine is carried almost entirely within the wing, a small housing projecting a short distance in front of the leading edge, and all flight tests so far conducted have been with pusher propeller arrangement, although later tests are to be conducted with the tractor set-up Two cockpits are provided in the wing one each side of the power plant and all control surfaces are operated by horn and cable hook-ups, with dual Deperdussin controls, one in each cockpit The propeller shaft, approximately seven feet long, extends between the two cockpits to the propeller, which is mounted 6 in in rear of and considerably above the trailing edge of the wing Tail surfaces are carried on two cantilever outrigger booms, oval in section, which extend in rear of and considerably above the main wing, thus providing for ground clearance of the tail group, and also placing the tail control surfaces up above the wing wash and most of the propeller blast The propeller turns between the two outrigger booms

The tail surfaces consist of a rectangular stabilizer and elevator combination of unusually high aspect ratio which terminates at each end in an elliptical vertical surface consisting of fin and rudder The control surfaces thus form a complete structural unit supported at each end by the booms from the wing Elevator adjustment is accomplished by rotating the entire unit in its boom mountings These outriggers taper in section and thickness and are heavily reinforced at the point of their attachment to the wing They are designed to carry air loads only and can therefore be made considerably smaller and lighter than though their function included carrying conventional tail skid loads No external bracing is used in their support and no vibration of the tail surfaces due to their comparative flexibility, has been experienced

The landing gear consists essentially, of three wheels carrying approximately equal loads, and grouped beneath the center section of the wing The two forward wheels have the unusually wide tread, for such a small plane, of 9 ft., and are placed considerably farther forward about 12 in than is possible in a conventional design The third wheel is located on the center line and just forward of the trailing edge and is pivoted for easy ground handling They are all located close to thick portions of the wing structure where there is ample room for retraction The experimental retractable gear proved satisfactory in actual flight tests, but for the purpose of carrying on extended tests of performance and maneuverability a conventionally permanent mounting has been temporarily given to the three wheels

Flight tests have now been conducted over a period of months and during many hours in the air the plane has shown remarkable maneuverability and performance, and although beset with most of the troubles common to new types, the plane as designed has proved eminently satisfactory All test flights have been made by Edward A Bellande, veteran western test pilot and superintendent of the western division of T A T -Maddux Air Lines

A front view of the Northrop all metal all wing type airplane

Three quarter rear view of the all-wing plane

THE experimental plane was arranged for flight tests as a pusher and tractor in order to determine the most satisfactory and efficient location of the propeller In the pusher arrangement a Mark III Cirrus engine, specially inverted by Menasco Motors Inc of Los Angeles drives the propeller through a tubular steel drive shaft The rear end of the shaft runs in a large ball bearing which is housed in a fin-like structure over the trailing edge of the wing The front end of the shaft is carried directly in a flexible coupling on a light flywheel mounted on the engine crankshaft The entire drive shaft mechanism weighs approximately 35 lb and has proved to be free from vibration or torque whip, as now installed In the tractor tests a Menasco A-4 four-in line inverted engine will drive the tractor propeller directly In either case cooling is provided by air passing through a large tunnel extending entirely through the wing from the front opening in the engine cowling to an opening just ahead of the trailing edge on the lower side of the wing Flight tests have proved this cooling arrangement entirely satisfactory and a material reduction in drag has been effected by enclosing the engine

The Northrop plane in flight

Considering the chassis and tail surface arrangement of the present experimental plane we find them to have many advantages The tail support structure is much lighter than an equivalent fuselage. The outrigger size is so small, and the angle of intersection between wing and outriggers such that there is little possibility of appreciable interference between the two The use of two or more supports makes possible a very efficient horizontal surface of high aspect ratio and no end loss, and its location to the rear and above the wing removes it from most turbulence due to wing or power plant, so that it has been found possible to use 30 per cent less surface on the horizontal stabilizer and elevator without loss of adequate control Therefore the drag of the control surfaces and their support is much less than in conventional designs

The arrangement of the landing gear concentrates the landing loads in a deep structure where they can easily be provided for, possibility of nose over is practically eliminated, and complete retraction of the whole chassis, including tail wheel, is a comparatively simple matter

With an eye to the future possibilities of the design it may be well at this point to compare the queer looking airplane with the best of conventional designs and to see how the items which contribute to drag have been affected The drag caused by the chassis has been entirely and comparatively easily eliminated The power-plant drag is not changed appreciably if we employ radial air cooled engines but in-line air cooled engines may be completely housed within the wing and cooled, as in the present model with considerable saving In case liquid cooled engines are used, they may be completely housed and readily accessible in flight The type of wing structure used is easily made water tight, so that the cooling liquid may be circulated within the wings by means of a spray system with return drains to a sump from which the engine is supplied Such a system is not subject to the faults of the ordinary wing-type radiator as the liquid is not under pressure and small leaks or even bullet holes would cause only a small loss of cooling liquid. If perfected such a cooling system would completely eliminate any drag chargeable to power plant cooling or placing and would also do away with much of the weight necessary in present types of liquid cooling radiators

IN THE "flying wing" type the fuselage is replaced by a thick wing section It is structurally more compact and more efficient in weight strength ratio than the fuselage It provides comparatively large cubic capacity, which can be increased within reason, with very little aerodynamic loss While the profile drag of a thick section is considerably greater than that of a normal airfoil its L/D characteristics are better than the over-all L/D of the best commercial plane Only a small proportion of the total surface is abnormally thick—the remainder being unaffected The net aerodynamic gain is therefore large Because of the smooth and uninterrupted taper between center and tip the loss due to the thick section is even less than would be expected Much

of the efficiency of this design seems to be due to the fact that there is no break in the airflow across the center section of the wing, thus rendering the sharp taper more effective than if the center section were disturbed by a fuselage. Another factor of great importance is that the sharp taper and thickened center section brings most of the supporting surface, and consequently most of the air load, toward the central portion of the wing system where the structure is best arranged to carry this load and that a relatively small portion of the total wing load is carried out toward the wing tips where the simple law of leverage renders it so difficult to care for high loadings.

The item of bracing and interference between wing, fuselage, and brace struts is completely removed, the heavily tapered wings being in the best possible form for an efficient full cantilever structure, and requiring no external bracing. There can be no landing gear-fuselage, or wing-fuselage interference. Only a small amount of drag results from the outrigger-wing intersection, and the 90 deg. intersection between the horizontal and vertical tail surfaces is the only point in the whole machine justifying fillets or fairings of any kind. The final item of parasite drag, that due to control surfaces which even in our conventional designs is the smallest of all, may be still further reduced through the use of smaller and more efficient surfaces, made possible by the better placing of surfaces and the smoother air flow over the entire machine, and the elimination of fuselage-tail and all brace structure interference.

A BRIEF IDEA of what future designs may be developed upon the basis of work already done is given here more as a mark for us to "shoot at" than as a prophecy. It is probable that large single engined mail and express planes will follow the present design quite closely, with a central engine compartment, and space for cargo and personnel on either side. In the light of tests already completed it is to be anticipated that such a design, with conventional wing and power loadings, may have a top speed well in excess of 200 m.p.h.

In the larger multi-engine transport class, the deepest part of the wing forms a very commodious cabin and the power plants, two or four in number, can be housed in readily accessible engine rooms on either side of the cabin. Such a design should have a cruising speed of more than 150 m.p.h. A machine of this type would provide excellent passenger vision forward, in addition to reasonable downward and sideward vision through windows in the lower portion of the bulge where the thickened center section tapers up to the wing. A small streamline compartment over the leading edge gives the pilot the best possible vision forward and downward, as well as full all-around vision upward and to the rear. Very excellent passenger protection can be provided structurally, and an unusual freedom of passenger movement would be provided and encouraged in the room shaped cabin, since planes of such design would carry their pay load so near to the c.g. that any possible variations in loading would scarcely affect the aerodynamic balance of the plane.

The placing of fuel tanks in the wings outboard of the engine compartments, and separated from them by double fireproof walls, would greatly reduce the fire hazard, or the chance of crashed tanks throwing gasoline on the engines.

Several interesting developments will no doubt attend the use of such flying wing designs. With parasite drag suppressed to a minimum, variable lift or variable area devices become much more effective and important than at present. Planes having such a large speed range would be greatly benefited by a variable pitch propeller, or possibly some form of transmission and gearing. And lastly, but by no means least, it would be almost essential to incorporate some form of "spoiler" so that the high efficiency so laboriously created could be "spoiled" in order that our ideal plane could reduce its normally excellent gliding range, and land at the average airport. Certainly the speed range and general performance which is possible to the flying wing or "all-wing" type airplane is most optimistic, and we hope that the experimental craft which we have developed has brought these possibilities close to realization for commercial use.

THE ORIGINAL "all-wing" plane shown in the accompanying photos was designed by W. K. Jay and the author during the latter part of 1928. Its early development and tests were carried on by the Avion Corporation, financed by George Hearst, San Francisco newspaper publisher, and Ada Wilbur, of Los Angeles.

In the fall of 1929 W. E. Boeing became interested in the development and arranged to take over the Avion Corporation as the nucleus of the present Northrop Aircraft Corporation, a division of the United Aircraft and Transport Corporation. An experimental factory and laboratory was at once erected on the United Airport, Burbank, and this is to be shortly enlarged to provide for the quantity production of all-metal aircraft of conventional type but employing the new flat plate structure which has been developed and which will be described in detail following the announcement of the first commercial plane.

A large amount of experimental work remains to be accomplished before the flying wing design can be considered commercially applicable, and it is planned by the heads of the United group that this work shall be carried on in a thorough and conservative manner before any planes of this type are put into production.

All test flights so far conducted have been made in secret from the Muroc Dry Lake bed on the Mojave desert, or more recently from the United Airport, but no public showing of the plane itself has yet been permitted and because of the many phases of flight performance being investigated it is not yet possible to announce complete flight data. However, the plane has proved to have normal flight characteristics in every respect and general performance has been more than satisfactory. A top speed of approximately 25 per cent better than any other design of like power and capacity has definitely been determined. A full determination of all flight data will be made by a long series of tests with various engine and propeller arrangements prior to actual design of a commercial model.

Some of the specifications of the experimental plane are as follows:

Span	30 ft, 6 in.
Length	20 ft.
Height overall	5 ft.
Wing area	184 sq.ft.
Maximum wing thickness	34 in.
Aspect ratio	5.1—1
Landing gear tread	9 ft.
Gross weight	1,600 lb.
Wing loading (lb. per sq. ft.)	8.7
Power loading (lb. per hp.)	17.8

GENERAL NEWS

HERBERT F. POWELL, *News Editor*

HIGH POINTS in the NEWS

► *Buffalo.* That city's second annual aviation show opens with 30 planes on hand including a Ford 5-AT seaplane. Event sponsored by Aero Club of Buffalo and managed by Byram Waterman.

► *Cincinnati.* Exposition which opened here March 26 in the Music Hall displays exhibits worth approximately half a million. Technical meetings to take place.

► *And Detroit.* World's largest hangar here prepared to house showings of some two hundred and fifty exhibitors when All-American exposition starts April 5.

► *"Based on theory, not fact."* So says Michigan Aircrafters Association as it drafts resolution calling for the abolishment of Michigan's new state aero regulation code.

► *Curtiss in Chile.* Branch factory is to be established by the Curtiss Wright Corp. near Santiago, Chile. Factory will have a capacity of 50 planes per year when completed.

► *Ascent gliders.* Colonel Young will soon call a meeting of Aero Branch supervising and engineering inspectors to discuss and study gliders.

► *Earnings.* U. A. & T. netted $5.42 per share in 1929, while Wright Aeronautical Corp. reports $1.50 per share for that period.

► *Zimmerly reached 24,074 ft.* N.A.A. findings reveal this as official mark for Barney Zimmerly in his altitude flight in a Lambert-powered Barling NB-3, at St. Louis.

Airports and Airlines

► *Loss $986,591.* So reports T.A.T.-Maddux Air Lines in its first annual statement. T.A.T. accounted for $746,519; Maddux, $240,072.

► *Sprinklers.* Tests of various types of sprinkler systems for hangars will be conducted by Bureau of Standards, April 22-30.

► *Calcium chloride corrosive.* Hence it should not be used for dust-laying purposes on airports, announces Colonel Young. Eats metal on planes.

► *Six and four.* Starting April 1, Eastern Air Transport will operate six mail planes daily between New York and Washington, and four between New York and Atlanta.

Instruct Glider Student by Radio

ROOSEVELT FIELD (L. I., N. Y.)—Successful experiments were recently conducted here with apparatus for instructing a glider pilot student in the air by the instructor on the ground through a short wave radio system. The student received the instructions through headphones, while the antenna wires was strung along the wing of the glider.

Wright Company Net $1.50 Per Share in '29

PATERSON (N. J.)—After depreciation, taxes, and other charges, Wright Aeronautical Corp. announces a net of $900,837 for the year ended Dec. 31, 1929, which is equal to $1.50 per share on 599,857 no-par shares of stock. In 1928, the net total was $2,433,771, or equivalent to $8.11 per share on 300,000 shares then outstanding.

Figures for 1929 and 1928 are given below:

	1929	1928
Net sales	$10,379,245	$8,781,516
General expense, depreciation, etc.	10,264,322	6,400,308
Operating income	$114,923	$2,381,408
Other income	883,199	364,430
Total income	$998,032	$2,745,838
Federal taxes	97,195	312,067
Net profit	$900,837	$2,433,771
Dividends	1,049,527	539,666
Deficit	$148,690	*$1,894,105
P. and L. surplus	5,175,167	4,799,757

*Surplus

For 1928, the company reported a total surplus of $4,823,136 compared to an earned surplus of $3,175,167, as of Dec. 31, 1929.

Williams Enters Thompson Race

CLEVELAND (OHIO)—It is announced that the first entry to be filed for the Thompson Trophy Speed Race (details of which were announced in AVIATION for March 8, page 496) came from Lieut. Alford J. Williams, who recently tendered his resignation to the Navy. Lieutenant Williams has not yet decided what machine he will fly in the race, but infers that he favors a commercial type.

Services Warners and Kinners

ST. LOUIS (MO.)—American Airways, Inc., announces that the St. Louis Universal Flying School is an authorized service and repair shop for Kinner and Warner-Scarab engines. Special machinery for overhauling the engines has been supplied by the manufacturers. In connection with this new engine service, the school is offering a master machinist course.

Aircraft Show Opens at Buffalo

Ford Seaplane Features Display of Thirty Airplanes

BUFFALO (N. Y.)—The setting of the stage for Buffalo's second annual aviation show was completed Saturday, March 22, when nearly thirty different planes were lined up in gala array on the floor of the big municipal hall, the Broadway Auditorium, and Mayor Charles E. Roesch threw a switch which turned powerful searchlight beams on the numerous products assembled for the aeronautical exposition.

Last minute entries of one of the latest type Ford seaplanes, of several gliders, and of a tiny home made craft powered with a motorcycle engine focussed renewed attention on the Buffalo exhibit.

The towing of the huge club type Ford plane through the narrow streets that lead from the civic airport, was in itself an advertisement for the show. Traffic was tied up for nearly an hour along the street and highway and the statement that aviation is becoming a veteran industry was belied by lined sidewalks and staring crowds much in the fashion of the old time circus welcomers. The big Ford seaplane is placed in the hub of the air show with center position. The club plane is the regular 5-AT Ford especially equipped for the owner who wishes to entertain his guests in the air. When this type of plane was first exhibited it was mounted on wheels. The Buffalo entry however, has pontoons and is the initial Ford to be thus equipped. It features a cabin for eight persons with a berth, lounge chairs, davenport, kitchenette, writing desk, loud speaker, and other conveniences for the guests.

Parade to Auditorium

Other planes, brightly painted, richly nickeled, and carefully swathed, formed an early parade to the big Auditorium Saturday morning and whetted public interest in the exhibition resulting in an enthusiastic and goodly crowd at the grand opening Saturday evening. Sunday the show was turned over to the sponsorship of the American Legion and repetitions of the speech of welcome delivered by Mayor Roesch at the lighting ceremony were echoed.

Monday, Charles S. "Casey" Jones, president of Curtiss Flying Service was to be honor guest of the Buffalo exhibit coming in person to view the show. Tuesday, Roger Q. Williams will be guest and host at the show. Wednesday, Elinor Smith will preside and

(Concluded on next page)

Detroit Air Show Opens Next Week

Few Meetings Planned; Exposition to Be Stressed

DETROIT (MICH.)—With late returns indicating an exhibitors' total in the neighborhood of 250 firms and with planes numbering between four and five score, preparations are nearly complete for the Third Annual All-American Aircraft Show, scheduled at the newly-finished world's largest hangar at the City Airport, April 5-12.

It appears that practically all of the 205,000 sq. ft. offered by the million dollar structure will be utilized in the display. Especially attractive is the fact that the exhibit will be under one roof and on one floor, and furthermore that it lies on the airport itself, allowing field demonstrations at will. No plane dis-assembling whatsoever is necessary, for the craft need only be landed and rolled into the building, even the largest plane of all, the new Fokker F 32.

Twenty Minutes From City

Formal opening of the show is scheduled at 3 p.m., Saturday, April 5. Each day, as has been the custom, has been given a special designation: Saturday, Dedication Day; Sunday, Famous Pilots' Day; Monday, Ladies' Day; Tuesday, International Day; Wednesday, Engineers' and Gliders' Day; Thursday, Diplomats' Day; Friday, Governor's Day; and Saturday, Family Day. Special bus service to the airport and show will be offered with 20 min. running time.

The Detroit event will be more free from meetings than have other shows. S.A.E. conferences will be under way at the Book-Cadillac Hotel on Wednesday, Thursday, and Friday, the Women's N.A.A. group will hold a gathering, and there will be two meetings of factory purchasing agents. But that will be all, and hence more time will be available for contact and sales work at the show itself.

The Detroit show is sponsored, as in the past, by the Aircraft Bureau of the Detroit Board of Commerce, with Ray Cooper as manager. The Executive Committee consists of Edward S. Evans, Chairman; William B. Mayo, Frank W. Blair, and William E. Metzger, vice chairmen; and Harvey J. Campbell, secretary.

Stinson Orders 300 H-S Props

PITTSBURGH (PA.)—An order for 300 steel propellers has been received by the Hamilton Standard Propeller Corp. from the Stinson Aircraft Corp. Delivery will start shortly.

Fairchild Orders 100 Kinners

FARMINGDALE (L. I., N. Y.)—Fairchild Airplane Mfg. Corp. has contracted with the Kinner Aeroplane & Motor Corp. for 100 of the K-5's, to be used in the Fairchild KR 21 planes.

Allied Motors Net Was $211,600

CHICAGO (ILL.)—After all charges, the net consolidated profit of Allied Motor Industries, Inc., for the year ended Dec. 31, 1929, totalled $211,600, equivalent to $0.47 per share on 238,509 shares of no-par common stock. Figures in 1928 were $340,317, or $1.33 per share on 180,900 shares of common stock then outstanding. Companies composing Allied Motor Industries include Great Lakes Aircraft Corp. and American Cirrus Engines, Inc.

Aircraft Show Opens At Buffalo, N. Y.

(Concluded from Page 649)

will subsequently be seen in flights at the Buffalo Airport. Thursday will be Eddie Stinson day, with that pilot appearing in person. Friday will be All-Buffalo day and Saturday Clarence E. Chamberlin will wind up the week's festivities.

The complete list of planes to be seen in the show is as follows: American Eagle biplane, monoplane and Trainer, manufactured by the American Eagle Aircraft Co., Kansas City; Bamberg Monoplane, manufactured by H. A. Bamberg, Buffalo; Curtiss Falcon, Robin, and Hawk manufactured by the Curtiss Aeroplane & Motor Co.; DeHavilland Moth exhibited by Curtiss Wright Flying Service; Eaglerock Bullet, Biplane, and Glider, exhibited by Becker Flying Service of Buffalo; Fleet, exhibited by the Fleet branch of Consolidated Aircraft; Ford Seaplane, exhibited by Ford Motor Co.; Franklin land plane manufactured by Franklin Aircraft Co.; Gee Bee, manufactured by Granville Brothers, of Springfield, Mass.; Aristocrat and G. A. C. Mail plane, shown by the new General Airplanes Co.; Great Lakes, Monocoupe, Stinson, Waco, and Ryan planes, shown by C. Dallas, Inc.; Mercury, manufactured by Mercury Aircraft Corp. of Hammondsport; Stearman, manufactured by Stearman Aircraft Corp. of Wichita; Taylor Chummy, manufactured by Taylor Brothers of Bradford, Pa.; Travel Air biplane and Travel Air monoplane, shown by Wright and Essenwein, Buffalo dealers; and Whittelsey Avian, manufactured by the Whittelsey Mfg. Co., of Bridgeport, Conn.

Byram Waterman is manager of Buffalo's Aviation show and the Aero Club of Buffalo stands as sponsor. The price of admission is 50 cents for adults and 25 cents for youngsters.

Booth exhibitors at the show include: Aviation Guide; P. F. Collier & Son, Green Light Club, Pacific Aviation News, The Tourist and Town Tidings; Becker Flying Service, local flying school; Buffalo Evening News and Buffalo Times; Buffalo Public Library, books on flying; Curtiss-Wright Flying Service; Curtiss Aeroplane & Motor Co., accessories; Charles Dallas, Inc., flying school; D. W. Flying Service, flying school which operates from LeRoy; Elm Vocational School, airplane parts and trade training; Grolier Society, books; John Hancock Insurance Co., aviation insurance; Harween Products Co., spark plugs; Lou Herschel, refreshments; J. L. Hudson & Co., clothing; Irving Air Chute Co.; D. F. Johnson, hardware; Jordon Distributors, Inc., automobiles; Kendall Refining Co., oil and gas; Kenny Flying Service, planes to rent; Kinner Airplane and Motor Co.; Moskito Airplane Co., model planes; McCarthy Bros. & Ford, amplifiers; Monte Hardware Co., model airport; Swan Marine Sales Co.; Niagara Body Co. and Ownabout Corp., boats; Postoffice Department, air mail; Sail Me Plane Co., model planes; Standard Mfg. Co., doors; Vacuum Oil Co., oil, gas; Whitney & Eckstein, airport seed; Wright and Essenwein, flying school; and Y.M.C.A. Boy's Camp.

Second Gas Tax Suit Filed in Utah

SALT LAKE CITY (UTAH)—The second suit to be filed within a few weeks by an air mail company to resist payment of the Utah gasoline tax was recently filed in the Third District Court in Salt Lake City by the Boeing Air Transport Co. Milton H. Welling, secretary of state, and A. E. Christensen, state treasurer, are named as defendants.

An allegation to the effect that the gasoline is purchased in Oklahoma and used only in the conduct of interstate commerce, mainly the carrying of mails between San Francisco and Chicago, is set up in the complaint.

Recovery of $2,039 paid by the company between Oct. 2, 1929 and Feb. 26, 1930, as gasoline tax is sought on the ground that the state has no right to tax interstate commerce. The first suit of similar nature was filed by the National Parks Airways, Inc. and is still pending in the Third district court.

Report on Stinson Sales

WAYNE (MICH.)—Sales of Stinson planes for the first two and a half months of 1930 showed an increase of 616 per cent over the same period last year, announces William A. Mara, vice-president of the Stinson Aircraft Corp. The increase in plane production represents a 540 per cent increase, while there has been a 46 per cent increase in the company's dealer organization since the first of the year. It is stated that Stinson unfilled orders now on hand total more than 75.

Tulsa Adopts Federal Rules

TULSA (OKLA.)—Tulsa has adopted an ordinance licensing and regulating aircraft, airmen, airports, and landing fields. Department of Commerce regulations were adopted in full and plans are now being made for organization of aerial police and other factors necessary to insure the carrying out of the requirements.

Warner's '29 Profit Amounted to $6,214 Net

DETROIT (MICH.)—According to the balance sheet of Dec. 31, 1929, Warner Aircraft Corp. showed current assets of $624,375 against current liabilities of $106,753, leaving a net working capital amounting to $517,622. During 1929, approximately 300 Scarab engines were sold compared with 85 in 1928.

Business done last year in the sales of engines and parts, and service, totaled $637,841, which figure greatly exceeds the previous year's amount of $188,308.

Net profit from normal operations amounted to $6,214. Deducting extraordinary losses of $46,180 during the year, the 1929 net loss was $39,965. Under extraordinary losses are engines produced which plane manufacturers failed to take delivery on even after cash deposits, the figure of this item reaching $44,051. These inventoried power plants had to be disassembled so that certain later improvements made on the Scarab could be incorporated in them.

Under current assets are listed inventories of raw materials, finished stock, and work in process, totaling $560,305.

In his remarks to stockholders, William O. Warner had this to say:

"The results for 1929 have been disappointing in that the predictions of supposedly well informed airplane manufacturers were that 15,000 planes would be manufactured and sold during the year whereas approximately 5,000 were sold. This reflected very naturally in the activity of engine manufacturers, especially during the last half of the year, when deliveries on contracts calling for engines were suspended.

"During the year the company purchased a 6-acre tract of land located on the Grand Trunk railroad between the Seven and Eight mile roads on Hoover Avenue, on which there has been erected a modern factory."

Curtiss Plans Garland Purchase

TULSA (OKLA.)—Curtiss-Wright Flying Service is to purchase the Garland aviation interests here, it has become known, and expects to establish state headquarters in Tulsa, following acquisition of the properties. The transaction will involve approximately $500,000 and will include the Garland Schools, which have Transport ratings; the Garland Airport on the Broken Arrow Road, 8 mi. from Tulsa, completely equipped with a modern administration building, hangars, student barracks, and a lighting system for night flying; and contracts which have been let for additional hangar and office space.

Sell First Pontooned Cessna

WICHITA (KAN.)—The first Cessna monoplane to be equipped with pontoons has been sold to the Hunter Brothers Valley Construction Co., Memphis, Tenn., for use in government Mississippi River survey projects.

Find Zimmerly Reached 24,074 Ft.

MOLINE (ILL.)—Lambert Aircraft Corp. announces the findings of the N.A.A. show Barney Zimmerly, Marshall, Mo., reached a height of 24,074 ft. in the Lambert-powered Barling NB-3 at St. Louis, during the International Aircraft Show. Thus, (as reported in AVIATION, Feb. 22, page 393), Zimmerly established a new light plane altitude record, the former mark having been 22,250 ft., held by Paul Baumer, Germany.

Air Intake Unit Offered

DEVELOPMENT of a device known as the Top-Side Intake for aircraft engines is announced by officials of the Aero Corporation of Calif. The unit, as shown above, consists of a special cast aluminum intake elbow piece incorporating carburetor choke valves. It was devised by Walter A. Hamilton, shop superintendent for the Aero Corporation.

Intake air is led to the carburetor by means of flexible metal tubing. This system is designed to draw in the air at a point where it is most free from dirt.

Facilities for machining the special casting used in the Hamilton Top-Side Intake have been installed at the Aero Corporation shops and this instrument will be produced in sufficient quantities for supplying operators using Pratt & Whitney engines, for which the device has been designed.

Roosevelt Vetoes Webb Bill

ALBANY (N.Y.)—Governor Roosevelt has vetoed a bill introduced by Senator Webb which, in substance, stated that owners or lessees of airports and owners or operators of aircraft should not be held liable in case of injury to persons or property incurred on such airports or in such planes, unless the injuries resulted from negligence of the owners. The governor claimed that "this bill takes away from the owner, proprietor, or lessee of an airport or landing field or aircraft, liability for negligence of their employees."

U. A. & T. '29 Earnings Netted $5.42 Per Share

NEW YORK (N. Y.)—A net income equal to $5.42 per share is reported for the year ending Dec. 31, 1929, by United Aircraft & Transport, through it's president, Frederick B. Rentschler. After all charges, taxes, and preferred dividends, the company reported a net income of $8,304,781.

These figures do not include the earnings to date of subsidiary companies acquired after Jan. 1, 1929, as it is United Aircraft & Transport's policy to capitalize all earnings of subsidiaries on the date of acquisition.

At the end of last year, common stock outstanding amounted to 1,837,842 shares. Total cash and readily marketable securities were valued at $15,953,319, while total assets represent $27,450,233, showing a ratio of more than sixteen to one with total current liabilities.

As of Dec. 31, 1929, unfilled orders of the equipment firms totaled $10,783,782, while so far in 1930, an additional volume of business representing $5,482,960 has been received.

During 1929 fixed assets increased from $3,130,941 to $11,420,258. Entirely new and modern plants have been provided for Pratt & Whitney, Vought, Sikorsky, Northrop, and Hamilton Standard Propeller (United subsidiaries). Extensive additions were completed for the Boeing Airplane Co.

Operating revenues and sales in 1929 totaled $31,423,617, compared with operating expenses of $21,660,364 and depreciation of $1,104,679, leaving operating income of $8,658,573.

United a Large Exporter

Total assets at the end of 1929 were $41,335,365, including cash of $6,014,574, demand loan of $2,000,000, United States certificates of indebtedness of $7,000,000 and other marketable securities of $346,082. Other investments, including stock of the Aviation Corporation of the Americas, was carried at $1,567,355.

It was pointed out by Mr. Rentschler that due to the company's practice of manufacturing nothing except under a definite contract or purchase order, 1930 operations will not be burdened by any undelivered products.

According to Department of Commerce records for aeronautical shipments abroad, it appears that approximately 50 per cent of the exportations were composed of United Aircraft & Transport products.

Eckener Here; To Get Medal

NEW YORK (N. Y.)—Dr. Hugo Eckener has arrived here from Germany. He will be awarded a special gold medal by the National Geographic Society at a ceremony in commemoration of the trip of the Graf Zeppelin around the world last year. The ceremony will take place at Washington, D. C., March 27.

Cincinnati's Aircraft Exposition Under Way

CINCINNATI (OHIO)—The Cincinnati Aircraft Show and a symposium known as the Technical Subject Meeting, opening on March 26 and scheduled to close on April 1, are this week holding attention, with many visitors in the Queen City for the Show and the addresses. G. B. Bodenhoff is managing director of the show which offers half a million dollars' worth of aircraft for public display at spacious Music Hall, planes ranging in size from a large Ford transport to the tiny Cincinnati built Aeronca. Numerous parts and accessory making companies have also contributed interesting exhibits, about 115 booths being devoted to aircraft accessories. Several gliders are suspended from the ceiling of Music Hall.

G. B. Bodenhoff

The outside of Music Hall is being illuminated by airport floodlights. An Army transportation balloon is making flights from the Music Hall roof. Principal among the special exhibits is one called the "Evolution of Transportation," tracing developments back to the pony express. Wright Field, Dayton, Ohio, delegated a detachment of five Army men and five Army planes. The Navy has sent three exhibits.

Williams to Speak

Among the celebrities attending or scheduled to attend—and there are many—are Orville Wright, Col. Clarence M. Young, Assistant Secretary for Aeronautics, U. S. Department of Commerce, and F. Trubee Davison, Assistant Secretary of War for Aeronautics.

The technical subject meetings are being held at the Hotel Sinton closing the night of April 1 with a public banquet at which Lieut. Alford Williams, Navy speed pilot, is to be chief speaker. Among others at the speakers' table will be Orville Wright, Russell Wilson, mayor of Cincinnati, C. O. Sherrill, city manager, Victor Heintz, prominent in Cincinnati aviation circles, Secretary Davison, Dr. Herman Schneider of the University of Cincinnati, and William Licht, president of the Cincinnati Chamber of Commerce.

The program of topics for the Technical Subject Meeting was arranged as follows: March 26, "The Airport and Its Construction", March 27, "Air Transportation", March 28, "Aircraft Production."

Schedule Bennett Race Sept. 1

CLEVELAND (OHIO)—The International Gordon Bennett Balloon Race will be held from here Labor Day, Sept. 1.

Approve Eagles, Western Engine

WASHINGTON (D. C.)—Two American Eagles have been added to the approved type class. According to certificate number, make and designation, type, power plant, weight empty, useful load, and gross weight, they are: No. 301—American Eagle D-430, four-place closed monoplane, Wright J6-5, 1,864 lb., 1,133 lb., 2,997 lb.; No. 302—American Eagle E-430, four-place closed monoplane, Continental A-70, 1,875 lb., 1,133 lb., 3,008 lb. Approved type engine certificate No. 45 has been awarded the Western L-7, a seven-cylinder, radial, air-cooled, power plant, announced as developing 130 hp. at 1,850 r.p.m.

Conference on Gliders To Be Held in Washington

WASHINGTON (D. C.)—Gliders—their structural strength and flight characteristics—will be the subject of a discussion to be held here and attended by supervising and engineering inspectors of the Aeronautics Branch located in various parts of the country. This meeting will be called within a short time by Col. Clarence M. Young, Assistant Secretary of Commerce for Aeronautics. In making this announcement Gilbert G. Budwig, Director of Air Regulation, said:

"All available data on the subject of gliders will be centralized in Washington where it will be examined, studied, and discussed by our field inspectors who will be called here for that purpose.

"While most of our inspectors are familiar with the construction, performance and operation of gliders, the popular interest in gliding is spreading so rapidly that there is need for uniform knowledge and procedure in order to develop and expand this scientific sport to the highest degree of safety.

"It is planned to have at the conference several types of gliders which will be representative of those being produced throughout the country, and which the inspectors will study from the standpoint of flight characteristics, structural strength, and also methods employed in launching them into the air.

"It is anticipated that much constructive information will be gained from the conference which will enable the Aeronautics Branch to assist materially in furthering the glider movement and especially toward promoting safety in glider operation."

Name Mid-South Speakers

MEMPHIS (TENN.)—Among the speakers scheduled to address those attending the first conference of the Mid South Aeronautic Association here, March 27-28 are Col. Clarence M. Young (tentatively), who will speak on "The Department of Commerce and Aviation"; Col. Halsey Dunwoody, "Air Mail in the Central South"; and Charles S. "Casey" Jones, "Aviation Development in America."

Issue Catalog of Goods Sold by Curtiss-Wright

NEW YORK (N. Y.)—For the benefit of its customers, the Curtiss-Wright Flying Service has published an 11x8.5 in. catalog listing the various aeronautical parts and equipment handled by the Curtiss-Wright branches throughout the country. This profusely illustrated compilation, listing more than 7,000 items, was prepared by W. S. Peper, manager of the accessory sales department, and is priced at one dollar. Curtiss-Wright announces it has contracted with more than 200 manufacturers of aviation parts and devices to act as their selling agents at the 35 Curtiss-Wright bases. Large aeronautical supplies will be housed in two warehouses, located at St. Louis and New York, so that branches may be quickly supplied with their needs.

Walter S. Peper

The catalog, printed on glossy paper, is indexed in the back. Pages are numbered according to the divisions of the book, of which there are the following: 21 airport equipment, books and maps, cable and wire, cameras and photographic supplies, clothing, electrical equipment, emergency equipment, engines, engine accessories, fabrics, and leather, finishing materials and accessories, fuels and lubricants, hardware and standard parts, instruments, landing gear and parts, metals (sheet, hose, and tubing), miscellaneous, propellers, radio and equipment, rubber goods (tires, tubes, and accessories), shop tools and equipment.

W. A. E.-Aero Merger Assured

LOS ANGELES (CALIF.)—Announcement has been made by officials of Western Air Express that 87 per cent of the outstanding shares of the Aero Corporation of Calif. have been deposited with the Security First National Bank of Los Angeles, thus assuring the consolidation of these two firms. Under the terms of the agreement at least 70 per cent of the outstanding stock was to have been deposited by March 15. Directors of W.A.E. are expected to meet before April 1 to officially place the merger in effect. No changes in personnel or operation plans have yet been announced. Terms of the merger agreement call for the exchange of twelve shares of Aero Corporation stock for one share of Western Air Express.

No Gardner Race This Year

ST. LOUIS (MO.)—The Gardner Trophy Race, held last Memorial Day from Parks Airport, will not be repeated this year. It is anticipated however that the event again will be run in 1931.

Plan Eighteen Stops For New England Tour

BOSTON (MASS.)—Definite plans for the New England Air Tour have been announced, the schedule calling for stops at eighteen communities, and for probable aerial visits at twenty or more others. The entire route will be flown over for inspection, by a survey plane carrying aviation technicians and fliers, in advance of the tour, and if unsatisfactory conditions are found anywhere, changes will be made accordingly. This survey committee will be headed by Capt. C. M. Knox, Commissioner of Aviation, Connecticut.

The thirty planes expected to participate will be divided into units of ten planes each. Some stops are to be made by one unit while other localities will be touched by the entire fleet of planes.

As definitely announced, the stops and number of airplanes to land are as follows:

Tuesday, May 27

Greenfield, Mass., ten planes.
Keene, N. H., ten planes.
Springfield, Vt., ten planes.
White River Junction, Vt., thirty planes.
Barre, Vt., thirty planes (luncheon)
Newport, Vt., thirty planes.
Concord, N. H., thirty planes (overnight stop).

Wednesday, May 28

Augusta, Me., ten planes.
Bangor, Me., ten planes.
Rockland, Me., ten planes.
Portland, Me., thirty planes (luncheon).
Manchester, N. H., ten planes.
Fitchburg, Mass., ten planes.
Worcester, Mass., ten planes.
Boston, Mass., thirty planes.
New Bedford, Mass., thirty planes (overnight stop).

Thursday, May 29

Providence Pawtucket, R. I. (What Cheer Airport), thirty planes.
Bridgeport, Conn., thirty planes (luncheon).
Hartford, Conn., thirty planes, (overnight stop).

Friday, May 30

Springfield, Mass., Bowles Airport dedication, thirty planes.

As the maximum number of stops have been provided for the tour, additional places will simply be circled by the craft and messages dropped. These cities and towns will probably be Holyoke, Mass., Montpelier, Burlington, Swanton and St. Johnsbury, Vt., and Laconia and Franklin, N. H., the first day; Auburn, Lewiston, Bath, Biddeford and Sanford, Me., Dover, N. H., Lawrence, Lowell, Lynn, Brockton, and Taunton, Mass., the second day, and Fall River, Mass., Newport, Wakefield, and Westerly, R. I., New London, New Haven, Danbury, Naugatuck, Waterbury, Meriden, and New Britain, Conn., the third day.

Report Sales of Fifteen Eagles

KANSAS CITY (MO.)—Among fifteen planes sold recently by the American Eagle Aircraft Corp. were seven bought by Charles Blossor, operator of a network of motor car sales agencies, who is laying plans for several airports and aircraft sales depots. One of the new four-place, folding-wing monoplanes, shown at the St. Louis show, went to the American Bakery Co.

Hawks Cross-Country Glider Trip Begins Sunday

SAN DIEGO (CALIF.)—On March 30, Capt. Frank M. Hawks, head of the aviation department of the Texas Company, will take-off from Lindbergh Field here on a cross-country glider-towing flight, scheduled to bring him to New York on April 8. The Department of Commerce has granted special permission for the flight, which will be the first of its kind.

Hawks will pilot the "Eaglet," a cabin glider designed and built by Prof. R. E. Franklin, of the University of Michigan, and his brother Wallace. The latter is to be the only passenger carried by pilot J. D. Jernigin, Jr., in the Wright-powered Waco which is to tow the glider.

The "Eaglet" has an instrument board consisting of an air speed indicator, altimeter, and bank indicator, while equipment will include a special Western Electric Co. phone set for communicating with Jernigin, and a 3-tube radio set.

Specifications of Craft

Especially built for the Texas Company which is sponsoring the trip, the "Eaglet" is of monoplane type, with a 50-ft. detachable wood wing, an overall length of 21 ft., weight of 300 lb. empty. With Hawks and his equipment, the weight will be approximately 500 lb.

The triangular-shaped fuselage of the "Eaglet" is of tube steel, as are the struts, and is fabric-covered. A pyrex-windowed hood will entirely cover the cockpit, but this can be quickly pushed back if a parachute jump becomes necessary.

The glider's combination skid and brake equipped wheel is fitted with a Goodrich glider tire.

Stops are planned at 19 airports en route, twelve of which have been designated as fueling stations for the Waco. Some 58 towns and cities are to be flown over, according to the schedule, with daily runs averaging from 280 to 420 mi. The overnight stops will be Tucson, Ariz., El Paso, Tex., Sweetwater, Tex., Tulsa, Okla., East St. Louis, Ill., Columbus, Ohio, and Buffalo, N. Y.

Naming Bach Representatives

LOS ANGELES (CALIF.)—T. Worden Hunter, newly appointed president of the Bach Aircraft Corp., is visiting in Detroit and other eastern centers for the purpose of closing agency contracts for distribution of Bach planes.

Huge Craft to Feature New York Aircraft Salon

NEW YORK (N. Y.)—Changes are being made in Madison Square Garden to accommodate the largest transport planes planned for exhibition there during the New York Aircraft Salon, May 3-10. Among these huge craft are expected to be the Fokker F-32, a 24-place Commodore flying boat, a Sikorsky S-38, a Keystone Patrician, an all-metal Ford, and a 16-place Savoia-Marchetti S-55.

The transport planes will be housed in the main arena of the building, along with displays of various transport lines. Lighter craft, for sport and training use, are to be shown in the main exhibition hall, while engine and accessory booths will be constructed on both floors and in the balcony. It is also planned to swing eight or nine planes from the ceiling.

Some of the other planes scheduled for the show include a Barling, Stearman, Szekely Flying Dutchman, Vought Corsair, Ireland amphibion, Curtiss Tanager, Travel Air, Great Lakes, a fully armored Boeing fighter, Fairfield, Waco, Gipsy Moth, Avian, Bellanca, Earle, Eaglerock, Buhl, and Monocoupe.

Only One Plane Per Exhibitor

From the number of reservations already made for the exposition, the Aeronautical Chamber of Commerce expects a total of 130 entries. In order to provide as varied a display as possible, only one plane model will be allowed each exhibitor. It is estimated the aircraft, engines, and accessories to be on hand for the show will be worth approximately $2,000,000, the transport plane section alone probably representing $500,000.

One of the special features is to be a life-size model of the Adams air mail pick-up device which will be mounted at one end of the arena. A Standard mail plane, suspended on a wire cable, will move across the hall, discharge a bag of mail, and pick up another.

A special exhibit will deal with Rear-Adm. Richard E. Byrd's trip to the South Pole, and another will contain historic planes among which will be machines of the pusher-type.

Plans are being made to land a number of distinguished visitors on the roof of the Garden in a blimp.

Clifford W. Henderson, who managed the 1928 and 1929 National Air Races, and the shows at Los Angeles and St. Louis, is director of the salon.

Woodwell Has Aero Department

PITTSBURGH (PA.)—Joseph Woodwell Co., automobile accessory firm, has organized an aeronautical department under the direction of Donald C. Scully. Such parts as nuts, bolts, cable, clevis pins, ferrules, shackles, fabric, and shock cord is carried in stock, and the company's service shop is equipped to care for repair work on airplane wheels, carburetors, and magnetos.

Ask Abolishment Of Michigan Code

Based on "Theory Rather Than Fact," say Aircrafters

DETROIT (MICH.)—Possibility that the newly-drawn Michigan State Air Code, which went into effect March 1, may be abolished or at least drastically revised is seen here in a recent resolution passed unanimously by the Michigan Aircrafters Association, an organization composed of aircraft operators from various sections of the lower peninsula. The resolution stated that the rules "seem to be based upon a magnified conception of the dangers of flying" and were founded upon 'theory rather than fact." William A. Mara, vice-president, Stinson Aircraft Corp., introduced the resolution before the group. Approximately 40 members attended.

Passage of the Mara resolution came toward the close of the second of two sessions lasting more than 10 hr., during which members of the group discussed with Capt. Ray Collins, State Director of Aeronautics, several of the regulations. The meeting was called and presided over by E. A. "Pete" Goff, sales manager of the Verville Aircraft Co. and president of the Aircrafters Association. The Mara resolution will be presented to the State Board and to Gov. Fred W. Green and requests that the organization be given a hearing before the Board and the Governor "for the purpose of presenting definite and detailed reasons for the abolition of the present rules." The resolution was read as follows:

"We move that the Michigan Board of Aeronautics and the Governor be petitioned to abolish the State Board's rules govern ing flying in Michigan.

"We feel that these rules make it increasingly difficult for individuals and organizations to use airplanes.

"Millions of dollars have been invested in aviation enterprises in Michigan. Other millions will be spent to demonstrate to the public that flying is a safe, comfortable and easy method of transportation and that any normal person can learn to fly an airplane just as any normal person can drive an automobile.

Think Federal Rules Sufficient

"We feel that the public will fly in increasingly large numbers when it learns how economically an airplane may be operated but that any rules which restrict an industry, hinder construction, growth, and increase the cost of operation, will surely decrease the market for and the use of airplanes.

"Already we find that these proposed rules have caused much alarm and confusion. These rules seem to be based upon a magnified conception of the dangers of flying. We believe that the State is basing its rules on theory rather than fact and suggest that the Board devote its activities toward a survey, if necessary, which will find the facts, and that until such time as the facts are obtained, these rules be abolished. We already have Federal rules which in our opinion sufficiently regulate flying.

"Finally, in accordance with the provisions of the State Air Laws, we request a hearing before the State Board and the Governor for the purpose of presenting definite and detailed reasons for the abolition of the present rules."

The Aircrafters' meeting was the first definite step made by Michigan airmen to do away with or soften certain "stringent" clauses in the State Code which created discontent from the very moment they were made known. In this meeting, the Association made it clear that its members "have no quarrel with Captain Collins," but that the Code is "untimely, unnecessary, and will tend to stifle the industry in Michigan."

Before presenting his motion, Mr. Mara described how "over-regulation" had made it difficult for the industry to sell planes and for anyone to learn to fly them. He stated that the Code was "incorrectly conceived" and challenged the advisability of having "non flying men" on the State Board. He asserted that his resolution embodied the attitude of the Stinson firm and if the Aircrafters failed to act, his corporation would formally appeal to the Governor. Following adoption of the Mara motion, the body formally passed another motion that the State Board's personnel be composed of men engaged in the business of aviation.

The State Board of Aeronautics, composed of William B. Mayo, Detroit, chairman; Claude Carney, of Kalamazoo; Harry Sparks, of Jackson, Frank Betts of Menominee and Harry Fletcher, of Alpena, was appointed by Governor Green by authority of legislation passed last summer. The Board then appointed Captain Collins as State Director, and recently S. B. Steers was named State Inspector. The State Code, practically embodies the Federal regulations, with a number of additional clauses incorporated to cope with local conditions.

The Aircrafters' organization plans to hold another meeting in Detroit during the week of the All-American Aircraft Show, during which a committee to appear before the Governor will be appointed. It is highly probable that Mr. Mara will be selected as spokesman for the committee.

Private License Awarded to "Bill"

DETROIT (MICH.)—After many years of designing, building and operating aircraft, William B. Stout, president of Stout Air Services, Inc., has been granted a private pilot license. He explained that he had "never found time" to get the license previously.

Issue North American Warrants

NEW YORK (N.Y.)—Negotiable warrants expiring Dec. 31, 1931, have been issued by North American Aviation, Inc., in connection with the original option given to Blair & Company, underwriters, to purchase 2,000,000 shares of North American common stock.

NEW PLANES

Another eight-place cabin plane, containing several features of the Wasp-powered eight place model, has been finished by the Emsco Aircraft Co., Downey, Calif., and put through satisfactory test flights. Powered with two Wright J6-9 engines, this machine has an adjustable-while-in-flight fin, mounted on the horizontal stabilizer, which allows easier manipulation of the craft when only one power plant is in use.

Successful test flights have been conducted on the new Northop cabin low-wing monoplane which is to mark the entry of the Northop Aircraft Corp., Division of U.A.&T. into the commercial field. Previous to this time the firm has confined its activities to the development of a radically new type of flying wing monoplane, a description of which appears in this issue. The new plane is all-metal in construction, carries six passengers, and employs a Wasp engine enclosed in an N.A.C.A. cowl.

Arrow Aircraft, Havelock, Neb., announces the Arrow "Tangerine" with LeBlond 85 hp. engine. The first "Tangerine" employs the Lambert 90 hp. plant. (The "Tangerine" is similar to the Arrow Sport Trainer, differing only in overall length, 7 in. being added due to alteration in engine mounts.)

Engineering data has been approved on the new American Eagle four-place cabin monoplane powered with either a J6-5 or Continental engines. Test flights, too, have been made and approval is expected shortly from Washington. The plane was designed by Stanley Wallace, chief engineer of the Wallace division of American Eagle. The plane has folding wings.

Mono Aircraft Corp., Moline, Ill., is putting the finishing touches on its new 1930 model, the Monocoupe 90. Specifications: Engine, Lambert R-266 90 hp. radial; span, 32 ft., wings tapered; capacity, two passengers. During the present season, the firm will limit its production to three types: the four-place Monocoach the Monocoupe 90, and the Monoprep open cockpit training plane.

Wedell-Williams, New Orleans, La., has just completed its "Wee-Winc," a small low-wing racing monoplane. It follows the earlier "Wee Will" in design. Specifications: Engine, J6-7; span 30 ft.; overall length 22 ft.; framework, chrome molybdenum. Mr. Williams plans to enter his plane in speed events this year, planning an initial appearance at the Chicago National Air Races.

The Timm Aircraft Corp., of Los Angeles, is rushing to completion an eight place, high-wing, twin engined cabin monoplane, for which test flights are scheduled early in April. The power plants are mounted directly forward of the wing on each side of the fuselage nose. A three-wheel landing gear is to be employed.

Chose Bayside Site For N. Y. Glider Meet

NEW YORK (N.Y.)—To date, twenty entries have been received for the New York Glider Carnival to be held April 25-26 from a hill adjoining the Queensborough Golf & Country Club, Bayside, L. I. They are American Motorless Aviation Corp., twelve; Gliders, Inc., two, Alexander Aircraft Co., two, American Sailplane Co., one, New York Glider Club, one, Long Island Aero Club, one, Philadelphia Glider Club, one.

Lieut. R. S. Barnaby, U.S.N., who piloted the glider launched from the dirigible Los Angeles in a test flight at Lakehurst, N. J., recently, has been selected to act as chief judge; state Norman Siegel of the Aeronautical Chamber of Commerce managing director.

This two-day event is being sponsored by the Aeronautical Chamber of Commerce, the National Glider Association, the New York Glider Club, the Aero Club of Long Island, and the American Motorless Aviation Corp. Invitations to participate have been sent to 15 glider manufacturers and every glider club in the East.

Fourteen Events Scheduled

The program will comprise fourteen contests, ranging from those for novices to those in which only first-class pilots can compete. For one of the first times, soaring types of gliders which have recently been used in this country for establishing duration records are to be shown and flown.

There will be four events for duration of flight. The first will be for novice glider pilots in primary training planes. It will be open to anyone not holding a glider pilot license and is being held primarily for those who are still beginners in this aerial endeavor.

The second event will be open to holders of a third-class license and will be limited to primary trainers. In the third event second class glider pilots will compete in two separate contests. One will be open to pilots flying primary gliders and the other to those wishing to compete in secondary gliders.

The contest for first-class pilots is divided into three parts, namely for primary trainers, secondary gliders, and soarers.

Interest shown by women has prompted the committee to schedule two events for women. One will be open to those with plane or glider licenses, the other to those without. Special exhibition flights by Dr. Wolfgang Klemperer of Germany, and Capt. Frank Hawks are planned.

Warner Committee Chairman

Edward P. Warner, editor of AVIATION, is general chairman of the New York Glider Carnival Committee and Charles T. Stork, New York plane distributor, is vice-chairman. They are being assisted by a committee of 30 which includes: Amelia Earhart, R. M. Atwater, F. B. Barlow, Luther K. Bell, Karl S. Betts, Prof. Alvin C. Busse, Capt. Arthur N. Chamberlin, Raymond E. Dowd, Sherburne Eaton, Edward S. Evans, Maj. Lester Gardner, C. J. P. Germaine, Capt. Frank Hawks, Norman Siegel, Lyman Johnson, Thomas T. Hildebrandt, Travis Hoke, Charles S. 'Casey" Jones, Prof. Alexander Klemin, F. C. Krummel, Mrs. Opal Kunz, Charles Macartney, William B. Mayo, George Morriss, Gen. John F. O'Ryan, Hector Perrier, Frank A. Tichenor, Donald F. Walker, L. W. Krummel and Capt. W. N. Lancaster.

Many Awards Offered

Seventeen trophies have been offered to date for the various events. They will be given by the National Glider Association, AVIATION Magazine, Popular Science, Curtiss-Wright Flying Service, Aero Digest, Scientific American, George Morriss, Capt. W. N. Lancaster, Kiwanis Club, Rotary Club, National Exchange Clubs, Capt. Frank Hawks, Aviation Consolidated, Inc., C. T. Stork Co., Long Island Chamber of Commerce, and the Ninety-Niners.

Awards to winners will be made at the New York Aircraft Salon.

Speedy Lines Feature Al Krapish's Low-Wing

ALEXANDER KRAPISH, chief test pilot for the Moth firm, is shown here with the special two-place low-wing plane he has just completed. Wright Gipsy power is employed in the craft which has a span of 30 ft. and an over all length of 24 ft. The wings, which are of full cantilever type, taper from 72 in. at the roots to 24 in. at the tips. The wheel fairing used by Krapish is similar to that used on the Tunison Scout plane developed in the West.

Report Massachusetts Violations, Accident Data

BOSTON (MASS.)—During the fiscal year ended Nov. 30, 1929, there were 41 suspensions and 28 reinstatements in airplane operations in Massachusetts while six court convictions were secured for violations of aircraft laws, and court fines to the amount of $200 were imposed, according to the annual report of the Aviation Section of the Massachusetts Registry of Motor Vehicles.

Of the 41 suspensions, 30 were cases of suspension of the right to operate, while the remaining 11 are divided between suspensions of licenses and registrations, and blacklisting of persons and planes. The leading cause of suspensions was dangerous flying which accounted for 11 of the total; there were seven cases of the flying of unregistered plane by unlicensed pilots, five fliers who did not use care and caution, and four airplanes condemned as no longer fit for operation. The remaining suspensions were scattered among numerous causes, such as stunting with passengers, operation under influence of liquor, dropping of articles from a plane in flight exceeding authority under student's permit, bad auto record, etc., etc.

State aircraft inspectors made 313 investigations during the year, of which 58 were of accidents, 70 of flying fields, 42 of planes examined for registration and repairs, and 38 of complaints of low flying, stunting field and aircraft violations; investigations were also made of air meets, schools, prosecutions forced landings, etc.

Of the six court convictions, three were secured against unlicensed planes and pilots two against unlicensed pilots, and one against an unlicensed pilot flying less than 1,000 ft. over an assembly. Court fines paid amounted to $100, while $100 in fines were appealed.

The report lists 95 accidents in 68 of which there was no injury to persons in 19 of which 29 persons were injured and 8 of which resulted in the death of 13 persons. Engine failure was assigned as the cause of 28 mishaps, improper operation accounted for 16, and structural failure for 10. Inexperience, dangerous operation, negligence, hard landing, poor judgment, drunkenness and weather conditions are among the other causes listed.

The personnel of the Aviation Section totals ten and includes a supervisor, inspectors, surveyors and clerks. There is a non-paid advisory board, comprising three official members and three honorary members which met nine times during the year. The medical force is made up of 18 flight surgeons who are paid by fees.

Forty-two pilot licenses were issued during the fiscal year and a total of $355 in license fees collected. Transport licenses were granted to 12, limited commercial licenses to 10 and private licenses to 20.

A total of 36 examinations were conducted. 38 pilots were examined for licenses and amendments, and 64 craft, for registration and repairs after accidents. The number of pilot permits issued during the year was 173, and of aircraft permits 128.

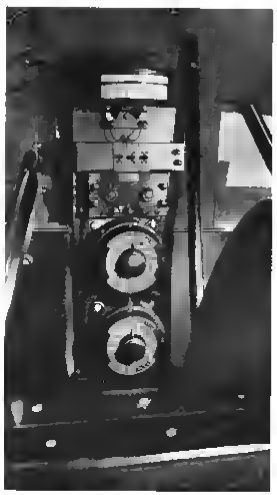
Three flying fields were approved, 14 were disapproved and decisions on 46 fields were pending when the report was made. Forty-seven surveys and two recheck surveys of fields were reported for the year and 25 blueprints were received.

Phillips Concern Plans Fuel Temperature Tests

BARTLESVILLE (OKLA.) — The Wasp-powered Travel Air of the Phillips Petroleum Co, in co-operation with the Natural Gasoline Association of America, has been equipped with a complete set of instruments for testing gasoline under actual flight conditions. These installations consist mainly of devices for determining and recording all the temperatures which might affect fuel performance in the air.

Wherever space has permitted, provision has been made for taking duplicate readings using both a thermocouple and a resistance thermometer for the purpose. An additional gasoline tank has also been installed in the fuselage of the machine so that pressure as well as gravity feed systems may be studied in detail.

The accompanying photograph shows the installation of the switch panel and recording instruments in the cabin of



the plane. The wall type millivoltmeter allows the pilot to obtain flight data unassisted, while a potentiometer, operated from beside or behind the pilot's seat, is used when more accurate readings are desired.

The installation of the resistance thermometers and thermocouples was accomplished by removing the fabric from the fuselage. All wiring is therefore enclosed and protected from shorts and breakage. The instruments are so placed that the following temperatures may be determined at any time.

1. Air temperature—right wing.
2. Temperature of vapor space in wing tank.
3. Temperature of gasoline in wing tank.
4. Temperature of vapor space in main tank.
5. Temperature of gasoline in main tank.
6. Temperature of gasoline feed line.
7. Temperature of gasoline in carburetor bowl.
8. Temperature of gasoline in fuel pump.
9. Temperature of gasoline in strainer.
10. Temperature of gasoline in wobble pump.
11. Temperature of air to carburetor intake.
12. Temperature of cylinder heads.
13. Temperature of cylinder head flanges.

Other information such as altitude, air speed, climbing and gliding angles and the like will, of course be obtained from the plane's regular instruments, and correlated with the above temperatures and any pertinent observations regarding engine operation. A full series of laboratory tests will also be run on the gasoline used.

The Phillips Petroleum Co. is one of a number of firms that are fitting airplanes for the testing of aviation gasoline. The work is sponsored by the Natural Gasoline Association of America and is under the general supervision of Dr. G. G. Brown, director of research for the association. The work will be spread over a considerable period of time in order that the effect of all possible atmospheric conditions may be studied, and it is confidently expected that the results will be of great value not only to the gasoline manufacturer, but to designers of planes and engines.

First Army T. M. Ready for Tests

BUFFALO (N. Y.)—The first of the Thomas Morse all-metal observation planes being manufactured for the Army by the Consolidated Aircraft Co., this city, was recently flown to Wright Field, Dayton, Ohio, for tests. The contract calls for delivery of 71 of these craft by July 1. A Pratt & Whitney Wasp powers the machine, which is especially fitted with arrangements for flares, night photography, radio equipment, and guns.

Pan American Orders Engine for Knock Rating

MIAMI (FLA.)—For use in its fuel testing laboratory, Pan American Airways has ordered a knock rating engine to be shipped here. The company is conducting experiments concerning the deterioration of fuels due to climatic conditions of heat and dampness, which are encountered at some stations along Pan American's route not served by adequate fuel services.

It has been the firm's policy to procure samples of gasoline used in different places on its line for laboratory testing, and there are now established here facilities similar to those employed by large oil refineries.

By knock rating, it is shown whether a fuel can be safely used in a modern high compression, air-cooled engine without injurious effects to the power plant through overheating or by detonation knocks. It is only in an internal combustion engine that this property can be tested and until recently very little was known about it. At present, however, several organizations are conducting researches along this line.

Other information such as altitude, air speed, climbing and gliding angles and the like will, of course be obtained from the plane's regular instruments, and correlated with the above temperatures and any pertinent observations regarding engine operation. A full series of laboratory tests will also be run on the gasoline used.

The Phillips Petroleum Co. is one of a number of firms that are fitting airplanes for the testing of aviation gasoline. The work is sponsored by the Natural Gasoline Association of America and is under the general supervision of Dr. G. G. Brown, director of research for the association. The work will be spread over a considerable period of time in order that the effect of all possible atmospheric conditions may be studied, and it is confidently expected that the results will be of great value not only to the gasoline manufacturer, but to designers of planes and engines.

"QUOTES"

"Other things being equal, an airplane simply with its motor cut is just as safe as a parachute provided a competent pilot is at the controls"—CLARENCE D. CHAMBERLIN, Crescent Aircraft Corp.

"Aviation, as represented by the aircraft industry and air transport, is just beginning to realize that it is a business and not a stunt."—COL. HALSEY DUNWOODY, American Airways, Inc.

"Suddenly, a wild man out in Oklahoma went haywire and started charging 5 cents a mile. We all followed, but thus far we have failed to devise new arithmetic to figure out where we are. We don't know whether we can push the rate up or not."—COL. PAUL HENDERSON, National Air Transport.

"The diesel type power plant uses most any kind of oil that is left over after the gasoline is distilled off, thus going the packers one better in their claim that they use everything except the squeal."—C. B. VEAL, Research Manager, S.A.E.

"An aerial policeman seems the logical solution. This officer would be able to get the Department of Commerce insignia on an offending plane and check its altitude on his altimeter."—R. WALLACE DAVIS, City Bureau of Aeronautics, Tampa, Fla.

Cessna Prices Down; Shares Up

WICHITA (KAN.)—Price reductions are announced by Cessna for its DC-6-A, which is now to sell for $11,000 instead of $11,500, and the DC-6-B which is to be marketed at $9,750, or $250 less than formerly. The company also states it will put its new two place machine out for less than $2,000. With the addition of 50,000 shares of no par value stock, the Cessna Aircraft Corp. has raised its capitalization to 100,000 shares. Besides Clyde V. Cessna, president, the board of directors now includes M. L. Arnold, former president of the Arnold Automobile Co., vice president and treasurer; Will G. Price of Price Auto Co., Carl Evans, also identified with the automotive industry, C. G. Yankee, prominent Wichita attorney, and W. B. Harrison, president of Union National Bank of Wichita.

New Standard Sells Subsidiary

PATERSON (N. J.)—New Standard Aircraft Corp. has sold its subsidiary, The New Standard Flying Service, Inc., to Ive McKinney; it has been announced by R. D. Heebner, Purchasing Agent of the New Standard Aircraft Corp. Mr. McKinney will not change the name of the concern he has bought, and will have headquarters at 140 Main St., Lodi, N. J.

Insert Glider Towing Changes in Regulations

WASHINGTON (D. C.)—In order to make the Airworthiness Requirements of the Air Commerce Regulations conform with the recent amendment to the Air Traffic Rules prohibiting the towing of "aircraft by other aircraft except by special permission of the Secretary of Commerce" (AVIATION, March 22, p. 616), Col. Clarence M. Young, Assistant Secretary of Commerce for Aeronautics, has promulgated the following amendment to the Airworthiness Requirements:

Section 1, Part 3, Paragraph 9, is hereby amended by deleting the first sentence, which reads as follows: "Towing of light aircraft may be practiced by man power, automotive power, such as automobiles and speed boats, or by an airplane" and substituting therefore the following:

State Cable Requirements

"Towing of light aircraft may be practiced by man power or automotive power, such as automobiles and speed boats, *but* the towing of aircraft by other aircraft is specifically prohibited, except by special permission of the Secretary of Commerce."

The remainder of the paragraph, unaffected by the amendment, reads:

"In all cases except when man power alone is used, an approved device shall be used for cutting loose the towing cable at the will of the pilot in the light aircraft. In order to eliminate the chance of failure of the main supporting structure due to excessive tow cable pull, the strength of the tow cable shall not exceed two-thirds of the maximum wing structure design load."

Examine Los Angeles Parts

WASHINGTON (D. C.)—During the recent inspection of the airship Los Angeles, at Lakehurst, N. J., by Capt. H. T. Wright, of the Navy Board of Inspection and Survey, approximately 100 samples of the dural girders were obtained for examination and tests by the Bureau of Standards to ascertain the effect of corrosion on the craft and how much longer the ship can safely remain in service. Some samples were taken from obviously corroded sections while others were cut out at random. The Navy Board's inspection was the first one made on the Los Angeles by that body, though ever since the craft was received from Germany in 1924, it has been customary for Lakehurst officials to make four inspections yearly of the ship.

Three Bachs for Peak Airways

LOS ANGELES (CALIF.)—Orders for three Bach tri-engined cabin monoplanes have been placed by Pike's Peak Airways, according to T. Worden Hunter, newly elected president of the Bach Aircraft Co.

Aviation Corp. to Reduce Stock

NEW YORK (N. Y.)—The New York Stock Exchange has received notification from The Aviation Corp. that it proposes to reduce its authorized common stock from 10,000,000 to 5,000,000 shares with a view to the saving of franchise taxes on 5,000,000 of the unissued shares. There are at present slightly more than 3,000,000 shares outstanding.

Plan Great Lakes Over-Water Air Tour

DETROIT (MICH.) — A 2,500-mi. Great Lakes Air Tour, in which approximately 30 amphibions, seaplanes, and flying boats would participate, visiting cities on all six of the Great Lakes and the Georgian Bay, may be sponsored by the Detroit Flying Club next summer, it was announced here recently by Edward J. Hill, president of the club. The tour's aim, Mr. Hill said, would be to demonstrate and popularize the use of over-water aircraft in the Great Lakes region.

According to a tentative schedule, the all-over-water route would start from Detroit, skirt the shores of Lakes Erie and Ontario as far as Rochester, N. Y., then cross Ontario to the Canadian shore, follow rivers to Lake Simcoe, Province of Ontario, to Georgian Bay, to Lake Superior, to Duluth, Minn., along the Lake Michigan western shore to Chicago, and finally back to Detroit.

The Detroit Flying Club, Hill said, has mailed letters to 32 cities along the proposed tour route, inquiring as to seaplane harbors, anchorages, and other accommodations. A definite announcement concerning the tour will be made in about three weeks when the survey is completed. Under present plans the Great Lakes tour would be non-competitive.

Cleveland Allots Race Profits

CLEVELAND (OHIO) — To express the city's appreciation for the contribution of the military air services to the success of the 1929 National Air Races, directors of the Cleveland Air Race & Show Corp. voted the Army Pilots' Relief Fund and the Navy Pilots' Relief Fund each $5,000 from the $100,000 profits of the races. Like sums were voted the Washington headquarters and the Cleveland Chapter of the National Aeronautic Association. A fund of $20,000 was set aside to underwrite the expense of the International Gordon Bennett Balloon Race, and it was decided to hold a two-day air carnival Aug. 31-Sept. 1 (Labor Day).

Brunner-Winkle Cuts Prices

GLENDALE (L.I.) — The Brunner Winkle Aircraft Corp., announces that prices of both models of the Bird plane have been reduced. The new price of the OX-5 Bird is $2,195 and of the Kinner-powered Bird, $4,095.

Curtiss to Establish Branch Plant in Chile

NEW YORK (N. Y.)—A branch factory of the Curtiss-Wright Corp. is to be established near Santiago, Chile, where military and commercial planes will be built, according to an announcement from the Curtiss-Wright Export Corp. This plant, to be situated at the new Los Cerrillos Airport 6 mi. from the center of Santiago, will have a capacity of 50 planes per year when completed.

The first contract to be put through will be that of 40 craft ordered by Arturo Merino, Chief of the Chilean Air Service. Twenty of this number will be Falcons while the other half of the order will probably be made up of Falcons, Hawks, and Fledglings.

There will be three Curtiss-Wright buildings—a steel and concrete manufacturing plant, a hangar of similar materials and an office structure. The airport on which they will be located is more than a mile long and approximately as wide, and a concrete race track is to be laid around its boundary. The central building will contain an aero club, restaurant, casino, and rooms for entertainment. Some materials for the new plant have already been shipped.

To Exchange Workmen

Agreements entered into by the Curtiss-Wright Export Corp., Commandante Merino, and General Blanche, Minister of War for Chile, specify a group of 25 picked Chilean workmen shall be sent immediately to the Curtiss Aeroplane and Motor Co. plant in Buffalo, N. Y., where they will study production methods for a year.

Fifteen department heads, engineers, and foremen of the Buffalo company are to go to Santiago, under the direction of Capt. S. C. Coon, to open the new factory and train native workmen. Captain Coon's position will be that of resident manager, and he plans to employ local mechanics and workmen as far as possible after they have undergone training by American experts.

Negotiations for the Chile proposition have been going on for several months between C. W. Webster, president of the Export company and Commandante Merino. The satisfactory conclusion was hastened, it is said, through the efforts and sanction of President Ibanez of Chile.

Timken Net $14,155,414 in '29

CANTON (OHIO)—After allowance of $1,775,000 for income taxes and $1,785,789 for depreciation, the Timken Roller Bearing Co., maker of landing wheel and other bearings, reports net profits of $14,155,414 for 1929, equal to $5.78 a share on 2,407,824 shares. This compares with $13,730,145 or $11.43 a share on 1,200,882 shares the year before. Timken paid $7,233,472 in cash dividends during the year, expended $7,740,000 for new construction, and transferred $6,942,823 to surplus.

PERSONNEL

DR MAX M MUNK has established an office at 823 Albee Bldg, f426 G St, Washington, D C, as consulting aeronautical engineer He has recently been associated with Alexander Aircraft Co in the design of the Alexander Bullet low-wing monoplane

KENNETH S CLAPP has resumed his former position as sales executive for the Wayne Co, Fort Wayne Ind, which will take over manufacture of grease and oil-dispensing equipment formerly produced by Clapp Patent Corp of Cleveland, Ohio.

LIEUT COMDR VINCENT A CLARKE will take over command of the dirigible Los Angeles on May 1, succeeding LIEUT COMDR HERBERT V WILEY, who has been assigned to U S S Tennessee

Comdr. V A Clarke

R O DULANEY has been appointed representative of Curtiss - Wright Flying Service at Fort Worth Tex

FRANK B HAMELY has been elected vice-president in charge of manufacturing of Independent Pneumatic Tool Co. Chicago, Ill

ROBERT MAKAY has been appointed airport supervisor of Calgary, Alta

T WARDEN HUNTER, of Detroit, Mich, has been elected president of Bach Aircraft Co, Inc, succeeding B L GRAVES, recently resigned

I SEWELL, field manager for Gulf Coast Airways, Inc, at Menefee Field, New Orleans, La, has been transferred to Fort Worth, Tex

MARSHALL C CALLENDER has been made secretary of the aeronautics bureau recently established by the New Orleans association of commerce

WILLIAM DINGS, former advertising manager and registrar of Universal School at St Louis, Mo, is now filling the same position with Von Hoffman Aircraft Co

ROBERT F CRAIG, assistant to the president of Fairfax Airport Corp, Kansas City, Kan, has been made permanent field manager of Fairfax Airport

ALEX M ROBSON has been appointed registrar of Universal Aviation Schools with headquarters at St Louis, Mo

CAPT W F LONG, recently with Curtiss-Wright Flying Service at Dallas, Tex, has gone to South America as represeotative of Spartan Aircraft Co., Tulsa, Okla

FRANKLIN ROSE, representative of Varney Air Lines at Oakland (Calif) Municipal Airport, has been made vice-president and general manager of Varney Air Service He will continue to make his headquarters at Oakland

PHILIP H PHILBIN, Jr, vice-president and general manager of Midcontinent Air Express, has been appointed to the Colorado State Aeronautical Commission to fill the vacancy occasioned by the resignation of REGINALD SINCLAIR

FLOYD N SHUMAKER former captain in the Naval Air Force, has been appointed air advisor to the Chinese Government He went to China as representative of The Aviation Corp

WILLIAM G ROSE has been appointed managing director of the Gordon Bennett Balloon Race which will start from Cleveland Airport on Labor Day

A L BETTY, formerly with West Coast Air Transport, has been placed in charge of engine servicing for Varney Air Lines, Portland, Ore

JACK MORAN, recently pilot and plane inspector for New England, has joined the engineering division of the Aeronautics Branch New York office

DON L BROWN, vice-president in charge of manufacturing of Pratt & Whitney Aircraft Co., has been elected president of United Airports of Connecticut, Inc BERNARD L WHELAN will be operations manager of the company's airport adjoining the Pratt & Whitney and Chance Vought factories, at Hartford

RICHARD KORMAN, recently designer for Neilsen Aircraft Corp, has joined the western aviation department of Shell Oil Co

ROSCOE V JONES and Dr SAMUEL R COOK have been added to the advisory board, Pacific group, of Aircraft Finance Corp of America.

ROYCROFT WALSH has been elected vice-president and a director of Hamilton Standard Propeller Corp, Pittsburgh, Pa., subsidiary of United Aircraft & Transport Corp Mr Walsh was formerly marketing counsellor for McGraw-Hill Co., and assistant manager of the production control division of Cheney Bros, silk manufacturers

Royeroft Walsh

DONALD MCPHERSON, formerly of the Ontario (Can) Forest Patrol, has been appointed instructor at Cape Breton Flying Club for next summer

FRANK REDD, Sarasota, Fla, has been appointed chairman of the aviation committee of the Florida chamber of commerce. Other members were appointed to represent various cities in the state.

Correction S S BOGGS is associate airways engineer in the Fort Worth district for the Airways Division of the Aeronautics Branch instead of with Varney Air Lines, as reported in the March f5 issue of AVIATION

AERONAUTICAL CALENDAR

May 27-30	All-New England Air Tour, starting from Springfield Airport, Springfield, Mass
June 28	Annual R A F. Display Hendon, Eng.
July 29-Aug 7	International Light Plane Tour starting from Tempelhof Airport, Berlin Germany
Aug 23-Sept. 1	National Air Races, Chicago, Ill

EXPOSITIONS

Mar 26-Apr 1	Cincinnati Aircraft Show, Music Hall Cincinnati, Ohio, Headquarters, Hotel Sinton
April 5-12	All-American Aircraft Show, Detroit.
April 18-26	Tri-State Aircraft Show, Convention Hall Camden, N J L D Odmar, executive secretary, Hotel Walt Whitman Annex
April 19-26	Aircraft Exhibition under auspices of Montreal Light Aeroplane Club, at The Stadium Montreal, Canada.
May 3-10	New York Aircraft Salon, auspices Metropolitan New York Division, Distributor-Dealers Section, Aeronautical Chamber of Commerce at Madison Square Garden New York City
June 28-July 6	Pacific Coast Aeronautical Exposition Oakland Calif. Municipal Airport.
July 6	International Transportation Exposition, Warsaw Poland
Sept. 6-8	International Aero Exhibition, Stockholm Sweden

MEETINGS AND CONFERENCES

April 8-9	S A E Aeronautic Meeting, Detroit, Mich
May 5	A S M E. conference on economy of maintenance and operation, New York, N Y
May 14-16	National Conference, Airport Section, Aeronautical Chamber of Commerce, Buffalo N. Y.
May 19-22	Fourth Annual Technical Aeronautics Meeting A S M E. Wright Field Dayton Ohio
June 9-12	Semi-annual meeting, A.S.M.E., Detroit Mich
July 3-5	Western States Aeronautical Conference Medford, Ore.
Sept 6-6	Fifth International Air Congress, under the auspices of the Royal Aero Club, The Hague Holland

AIRPORT DEDICATIONS

Apr 9-10	Troy Ala. Airport
April 11-13	Curtiss-Wright Airport, Dallas, Tex
April 11-13	Oklahoma City Okla, Airport
April 19	New Bedford-Fairhaven Airport dedications and meet. New Bedford Mass
May 27	Turners Falls-Greenfield Mass
May 30-June 1	Dedication and Air Circus, Colusa, Calif Municipal Airport.
May 30-June 1	Dedication and Air Meet, Bowles Airport, Springfield Mass
May 31	Abilene Tex.- Municipal Airport

N. Y. Police Get Two More S-56's

NEW YORK (N Y)—Two more Savoia-Marchettis S-56's will be added to the New York Police Department, one of which is to be delivered immediately, it is stated

BRIEFLY

An agreement with regard to the organization and inauguration of trans-Atlantic Zeppelin service has been signed by the National City Bank of New York, the German Zeppelin Co., Goodyear-Zeppelin Corp, United Aircraft & Transport Corp, the international Zeppelin Transport Corp., and other banking and industrial organizations

The South Bay Glider Meet, first of a series of local meets to be held in the vicinity of Los Angeles preliminary to the national meet which is planned later in the year, will be held March 30

At the end of 1929, there were about 220 De Havilland Moth planes in use in Canada, of which about 130 were sold during the year About 50 per cent of the manufacturing operations, as well as assembly, is now carried out in Canada

Tests of the new Blue Streak five-cylinder engine, manufactured in Wichita, Kan, are soon to be undertaken

Trustee's sale of the assets of Stewart Aircraft Co., Cleveland, Ohio, recently declared bankrupt, has thus far netted $23,945

North Shore Airways, distributor for Arrow Aircraft & Motors Corp in Massachusetts, sold its first Arrow Sport trainer for $3,000, with free flying course included

The special Ford club plane exhibited at the St. Louis Exposition will be used for commercial purposes by Timken Roller Bearing Co It has three Wasp engines, is insulated with Balsa wood, and has many luxurious appointments including ice-box, sink and drain board, gas stove, radio, and Alvin silverware

Aurora Aircraft Building, Aurora, Colo., was recently damaged by fire, but all planes were saved

First Lieut John D Corkille, stationed with the Air Corps Materiel Division at Wright Field, Dayton, Ohio, has been addressed a letter of commendation by Maj.-Gen James E. Fechet for his coolness and heroism in twice extinguishing fire in a plane he was flying, and bringing it down to a safe landing

Marvel Crosson Glider Association, Los Angeles, would like to form affiliated girls' glider clubs throughout the country, Those interested may communicate with the president, Miss Jean Stapf, care McGraw-Hill Co of Calif, Los Angeles

Of the 95 pilots graduated from Kelly Field, San Antonio, Tex., Feb. 27, 24 were sent on foreign duty to Hawaii and Panama Instruction of a new class of 96 students began March 10

Wilton Ferris has been made chairman of an aviation committee selected by the Lincoln, Neb, Junior Chamber of Commerce to promote an air tour covering the trade territory near Lincoln

Commercial Investment Trust Corp, New York, N Y., has signed a contract to finance the sale of Consolidated Aircraft Corp planes, wholesale and retail

Schools and Colleges

AERO SCHOOLS OF VANCOUVER has recently started operation at 2163 West Fourth Ave., Vancouver, B C Harold Davenport, formerly chief engineer in British Columbia for Western Canada Airways, Ltd., is at the head of the school

BURNS FLYERS AIR COLLEGE is the new name of the company formerly known as Burns Flyers, Detroit

CONSOLIDATED AIR COLLEGE, Richards Field, Kansas City, has announced reductions in tuition rates as follows Dual instruction, formerly $25 an hour now $f5; solo flying, formerly $20 for private flying students, now $13 an hour, for students in the limited commercial pilot class, formerly $18, now $1f 50 an hour

CURTISS-WRIGHT FLYING SCHOOL, Denver, which opened in August, 1929, now has 88 students enrolled, it is reported

JOE BEN LIEVRE ARACRAFT, INC, has opened a night ground school at the Alamo Airport, San Antonio, Tex

PARKS AIR COLLEGE, East St Louis, fll, announces the appointment of three regional sales promotion managers as follows Roy W Brown at St Louis for the eastern and middle-western states W A Handley for the far western and Pacific Coast States and Ernest M Crosby for the middle western and Rocky Mountain districts

PENN SCHOOL OF AVIATION, Pittsburgh, Pa., founded about eight months ago, announces that it has graduated nineteen private pilots In its ground school division 69 students have been graduated from the basic ground course, and 26 from the aviation business course

RANKIN BROTHERS AVIATION SCHOOL founded by Dick and Dudley Rankin has moved to a field of its own near Portland, Ore Twenty students are enrolled

SKYWAYS, LTD, Toronto, Ont., has acquired the flying school of Aircraft, Ltd.

UNIVERSAL SCHOOL, Kansas City, will send its students by plane to St. Louis at its own expense for ten hours' training in tri-engine machines

Representatives Named

RAPID AVIATION—W Dale Jones, Hay Springs, Neb

STINSON-DETROITER—Parkhill Motor Sales Co, Bloomington, Ill., for central Illinois

CURTISS WRIGHT—East Coast Aircraft Corp, Boston, Mass, exclusive distributor for New England except Connecticut, has appointed as dealers Roy Keeley, Taunton, Mass; Sound Airways, New Bedford, Mass.; Russell Boardman, Hyannis and Boston, Mass., Barnes Flying Service, Westfield, Mass; Orange-Athol Flying Service, Orange and Athol, Mass; Wachusett Airways, Fitchburg, Mass; New Hampshire Aircraft & Marine Corp, Robert Fogg, Concord, N H

Set June 28-July 6 As Pacific Show Dates

OAKLAND (CALIF.)—June 28-July 6, inclusive, have been set as the dates for the first annual Pacific Coast Aeronautical Exposition to be held at the Municipal Airport, this city. Sanction has been granted by the Aeronautical Chamber of Commerce for the staging of a class "C" show, and the large display will be sponsored by distributors and dealers of the Pacific Coast, according to W P Butler, managing director of the exposition

Special plans are now being made to handle the transportation of large crowds to and from the airport from the various cities of the vicinity—Berkeley, Alameda, and Oakland—which are all clustered closely about the Bay District, and arrangements are being made to handle as many as 50,000 spectators per day at the field, if necessary

This will be the first aircraft exposition of major proportions ever held in the Bay region and a record turn-out is anticipated A check of the normal week-end attendance at the Oakland Airport when no special events are scheduled, has revealed average crowds of approximately 20,000 persons on a Sunday alone, so that promoters of the show have forecast a figure of at least 100,000 paid admissions

During the week of the Show a special street car and bus service will be maintained from downtown Oakland to the site of the exposition, while special speedboat, ferry, and train service will be maintained between the field, San Francisco, and other of the Bay cities A further means of rapid transportation will be provided by Air Ferries, Ltd., now operating an amphibion service across the Bay on a 15-min schedule and soon to initiate additional services to Sacramento, Stockton and Oakland with all lines making regular stops at the exposition grounds

New Firms Announced

NATIONAL AIRWAYS, incorporated in Delaware, has qualified to do business in Alabama with headquarters at Decatur, capitalized at $f.000.000 with $235,540 paid in, William B McAfee is Alabama agent

ARLANO MANUFACTURING CO, LTD, Vancouver, B C, by W E Anderson The firm is building a plant on Lulu Island, near the Vancouver airport

BIGELOW JOHNSON, INC, Parkwater, Wash, capital, $25 000, by H W Johnson and E C Bigelow, to manufacture airplanes

WILMINGTON AIR TERMINAL, LTD., Wilmington, Calif, capital $500,000 by Roy Windell, L A Mangan, H and R Carpenter, George S Brownell, Alfred Larson, and others.

NASHVILLE FLYING SERVICE, McConnell Field, Nashville, Tenn, Lieut Robert O Lindsey, director, to offer instruction, taxi service, and scenic tours

AIRPORTS AND AIRLINES

T.A.T.-Maddux Has Net Deficit of $986,591

NEW YORK (N. Y.)—Transcontinental Air Transport-Maddux Air Lines has reported a loss of $986,591 in the company's first annual statement. The original T.A.T. concern accounted for $746,519 of this, according to C. M. Keys, chairman of the board of directors, and Maddux for $240,072. The income account for the consolidated company—which includes operations of T.A.T. between July 8, 1929, and Dec. 31, and of Maddux between Aug. 1, 1929 and Dec. 31—shows total operating revenue of $479,479 and operating expense of $1,771,158. The net operating loss thus was $1,291,679, which was reduced to the above net deficit by miscellaneous income.

The total cost of the consolidated system was $3,700,602. The sum of $2,932,235 was spent on the transcontinental line and the balance on Maddux. Current assets at the close of 1929 totalled $3,408,337, of which $465,700 was cash and $2,282,463 was United States Treasury certificates. Fixed assets, less depreciation, totalled $3,700,602 and the total assets reached $7,588,004. Current liabilities were $387,966. The paid-in surplus and reserve for contingencies had been $2,885,568 on Jan. 1, 1929, and thus was reduced to $1,899,774 at the close of 1929 to take care of the operating loss.

Mr. Keys stated in his report, in regard to the acquisition of the Maddux company, that up to Dec. 31, 1929, T.A.T. had issued 153,765 shares of its capital stock, represented by voting trust certificates, and had received in exchange 307,530 Maddux shares, represented by voting trust certificates, which amounted to 97.05 per cent of the total voting certificates for Maddux stock outstanding. The flying equipment of

(Concluded on page 662)

Provincial Service Reports 1929

TORONTA (ONT.)—The Ontario Provincial Air Service report of operations in 1929 shows a total of 11,602 flying hours; 1,020 000 passenger miles and 669,423 aircraft miles. This established a new high record for the history of the organization. There were only a few minor accidents and none of the members received serious or fatal injuries. Cost of overhauling and repairing amounted to $8,449, while the rental of additional planes for forest fire fighting service totaled $93,686. There were 26 planes in the organization in 1929, four of which were purchased during the year at a cost of $41,223.

Pickwick and P.A.A. Co-operate

LOS ANGELES (CALIF.)—Details of an operating agreement between Pickwick Airways and Pan American Airways, to be effective at once, have been announced by Charles F. Wren, president of the former company. Hereafter all northbound air transport business originating in Central or South America and destined for Pacific Coast points along the Pickwick line from San Geronimo, Mexico, to Los Angeles, will be directed by Pan American over the Pickwick line at San Geronimo. In a reciprocal arrangement, Pickwick will turn over to Pan American at San Geronimo all of its southbound business, making the city of San Geronimo its southern terminus.

Calcium Chloride Use At Ports Disapproved

WASHINGTON (D. C.) — Calcium chloride should not be used on airports for dust-laying purposes on account of its corrosive properties, it has been announced by Clarence M. Young, head of the Aeronautics Branch, following a study of the subject by his department, the N.A.C.A. and the National Bureau of Standards. Opinion was unanimous that many metals used in aircraft construction were affected by the acid and that ordinary protective methods do not suffice. The report states in part:

"The characteristic property of calcium chloride which renders it useful for laying the dust, that is its deliquescence, has a very important bearing on its corrosive properties. Calcium chloride is not so readily removed from a metal surface as are most other chlorides for which a washing by vigorous spraying will usually suffice. The hygroscopic dust particles, rendered so by the calcium chloride which has been absorbed, cling tenaciously to any metal surface and to other dirt particles and thus may build up an adherent corrosive coating. This is especially so in re-entrant angles and crevices where the enamel or other protective coating may not completely cover the metal.

"Corrosion of aluminum alloys of the type represented by duralumin may manifest itself in two distinctly different ways. In addition to a surface attack resulting in a roughening of the surface sometimes so pronounced however as to constitute severe pitting, the material may become relatively weak and brittle without any marked visible evidence on the surface of the attack. Corrosion of this type is intercrystalline in nature and the attack penetrates into the metal. This condition of intercrystalline brittleness is most serious in the case of sheet material in forgings and castings, the effect is relatively a minor one. On account of the insidious nature of the intercrystalline or embrittlement type of corrosion, showing as it does no marked evidence of its presence or the extent to which it has progressed, special care should be taken to guard against it.

"The corrosion of steel is of the surface roughening type. Intercrystalline embrittlement corrosion of steel is not known except under unusual conditions such as would not obtain in the open atmosphere. In the case under discussion the adherent film of hygroscopic dirt may serve to obscure quite effectively any corrosive attack which may be going on until it becomes well pronounced."

Mail Bill Reported By Committee to House

WASHINGTON (D. C.)—At last the Watres air mail bill has been reported out of committee onto the floor of the House. After lying in the Post Office and Post Roads Committee more than a month pressure was brought to bear by the administration through the Steering Committee of the House, as was reported in AVIATION, March 22, and Mr. Watres was ordered by the Post Office and Post Roads Committee to report the bill out.

Several changes in the language of the bill have been made, but none of these affect it vitally. The original language of the bill authorizing the Postmaster General to designate "fixed rates per mile for definite weight spaces, such rates not to exceed $1.25 per mile" has been changed to 'rates not to exceed $1.25 per mile." In the altered bill it is stated that 'In awarding air mail contracts the Postmaster General *may* give proper consideration to the equities of air mail and other aircraft operators with respect to the routes which they have been operating and the territories which they have been serving." The change was made after the point had been raised at the hearing that the *"will"* of the original language might become a ground of contention between would-be mail contractors and the Post Office Department.

The provision authorizing the Postmaster General to establish routes "for the transportation of mail by aircraft to Canada or Mexico" has been altered to read, "to Canada within 150 mi. of the International Boundary line." Mexico was eliminated.

In its present form the bill was expected to pass the House before the close of this week, but on such optimism is entertained toward its future in the Senate. The bill introduced by Senator McNary, similar in form to Mr. Watres' measure, has lain on the shelves of the Senate Post Offices and Post Roads Committee since its introduction. Committee action probably will be taken upon it as soon as the Watres bill passes the House. Proponents of the bill, however, fear and expect that the clause on which contractors have put so much hope—that allowing the Postmaster General to award contracts by negotiation and without advertising for or considering bids—will be stricken out.

Newark Hangar Burns

NEWARK (N. J.)—Fire believed to be of incendiary origin swept through the Newark Air Services hangar here March 23 and did about $40,000 damage.

United Opens New Chicago Traffic Office

CHICAGO (ILL.)—In anticipation of the inauguration of its enlarged passenger service sometime in May, United Aircraft & Transport Corp. has opened an elaborate ticket office and waiting room at the corner of Michigan Boulevard and Van Buren Street, this city. Boeing Air Transport and Stout Air Services are represented there. Stout will continue to maintain a representative at the Air Passenger Bureau of the Chicago Air Traffic Association, however, an arrangement which Boeing has never had.

The increased service will consist of the operation of Boeing eighteen passenger transports over the transcontinental route between Chicago and San Francisco. At present these planes are in operation only between San Francisco and Cheyenne. Stout planes will operate in connection with this service, thus providing an all-air service between Cleveland and the West Coast. It has been stated that Stout would extend to New York City but this is regarded on good authority to be rather remote at present.

The decoration of the office is modernistic. This decorative scheme and the furniture was designed by Huszagh and Hill, Chicago architects. The walls and ceiling are covered with hand-painted canvas, which was painted before being applied to the plaster. The upper portions of the walls are done in orange and the panels on the lower portion are in brown. The borders and other decorations are black and white. The ceiling has been finished in various shades of gray, with planes in color.

Desks for the traffic men are done in silver, black and orange. The chairs are of natural cherry with black leather. The lounges at the rear are covered entirely with black leather with the exception of wooden frames at the base, which are finished in gold and gray. Executive offices are in the basement.

Schedule Limits Student Flights

KANSAS CITY (MO.)—An order has been issued by Roy C. Farrell, manager of the Kansas City Municipal Airport, limiting the time local flying schools may use the field for student training. This order was made necessary because of the increasing transport traffic at the field. The schedule for student training is between 1 a.m. and 8 a.m.; 9:45 a.m. to 11 a.m., 4:45 p.m. to 7:30 p.m. at the present time.

Engineering Council Names Port Committee

WASHINGTON (D. C.)—Creation of an airport committee by the American Engineering Council has just been announced. The purpose of the committee is to draw up a plan by which it is hoped the Aeronautics Branch and the A.E.C. may cooperate "in formulating a report for the general information and guidance of public bodies, indicating the diversity and importance of engineering problems in the design of airports."

The original intent was for the committee to make such a survey and report, rather than to draw plans for one, but the objection of civil engineers to such a procedure is believed responsible for the emasculation of the project. After the plan has been formulated by the committee it will be presented either to the administrative board or to the annual meeting of the A.E.C. for approval or disapproval before any further action can be taken.

Prof. Ralph A. Fogg, head of the department of civil engineering, Lehigh University, has been named chairman of the committee. Its other members are: Perry A. Fellows, city engineer, Detroit; W. W. Horner, chief engineer, St. Louis; Harrison E. Howe, editor, *Journal of Industrial and Engineering Chemistry*; Alexander Klemin, head of the Guggenheim School of Aeronautics, N. Y. U.; and H. G. Shirley, commissioner of highways, Richmond, Va.

Interior of United Aircraft & Transport Corp.'s Traffic Office at Chicago

To Test Sprinklers For Hangars in April

WASHINGTON, (D. C.)—Tests of the efficiency of various sprinkler systems in an airplane hangar constructed of wood are to be held at the Bureau of Standards April 22 to 30. The hangar is almost complete and the sprinkler systems have been installed. Four types are to be tested: The dry pipe, the wet pipe, and the open system with automatically controlled water supply operated by thermostatic devices, in both overhead and overhead-and-floor installations.

The National Board of Fire Underwriters is postponing the promulgation of its code for the construction and protection of airports until the conclusion of the tests. Tentative requirements of the code in regard to automatic sprinklers aroused so much opposition in the industry that the Aeronautics Branch has arranged these practical tests to determine the efficiency of the sprinkler systems.

Materials Donated

A 65x80 ft. wooden hangar, having a clearance of 18 ft. from the floor to the lower chord of the roof trusses has been built under the supervision of the National Committee on Wood Utilization. The structure has been coated with aluminum paints to protect the wood from saturation due to sprinkler discharge. A heater and blower system also has been installed to dry out the hangar after each test. The floor of the hangar is of concrete. A 55 000 gal. water tank 75 ft. high has been built for the tests. Due to the co-operation of the National Automatic Sprinkler Association, the National Lumber Manufacturers Association, the Chicago Rigid Iron Works and other firms which have donated materials the hangar has been built and equipped at a comparatively low cost to the government.

Four types of fires are to be started, under conditions approximately as nearly as possible the usual hangar layout: the wing of a plane, protruding over a workbench, will be ignited by a blowtorch or similar source of combustion in operation on the bench; a fire will be started in the inside of a wing, as from faulty wiring; the fuselage of a plane over which some 15 gal. of gas have been sprinkled will be ignited; a fire fed by 200-300 gal. of leaking gasoline will be started in a group of five or six planes. Seventeen obsolete planes are being assembled for the tests. Among them are 11 Navy SC1 and SC2, a Loening amphibion, a Vought a Fokker and a Douglas.

The major blazes will be set April 29 and 30 weather permitting. So much interest has been shown in the project by the general public that the Aeronautics Branch must limit attendance to those of the aeronautical world to whom invitations are issued. The Fact-Finding Committee which has arranged the tests is under the chairmanship of Col. Harry H. Blee.

AIRPORT CONSTRUCTION PROJECTS

East

A new administration building provided by the city, has been put in commission at Logan Field, Baltimore It will be used by the field manager and Eastern Air Transport representatives

Seneca Falls, N Y, plans to purchase 275 acres near Aurelius N. Y., for the establishing of a municipal airport. The city expects to spend $85 000 improving the property

South

Erection of a new steel and corrugated hangar at the Gulfport (Miss) Airport has been completed The hangar measures 80 x 90 ft and was built by Zach Bailey at an estimated cost of $10,000 It will be used by the Curtiss-Wright Flying Service The airport was dedicated March 22

A 640-acre tract has been acquired by Lubbock, Tex., for a municipal airport on the proceeds of a bond issue Bids are being received by the Lubbock Chamber of Commerce for hangars to measure 120 ft square.

The city of El Paso has purchased a hangar from Scenic Airways for $17,500 and plans to install immigration and customs offices, a modern coffee shop and living quarters for the airport manager

The Curtiss-Wright Airport at Dallas represents a total expenditure of $250,000 The new steel hangar costing $100,000 is fully equipped with spacious offices, shops and storeroom

The contract has been awarded by Denton, Tex, for construction of 40 x 80-ft hangar, to the International Derrick & Equipment Co, Columbus, Ohio

Flood lights at Jacksonville (Fla) Municipal Airport will be installed by the General Electric Co., at a cost of $3,894 75

The Greymore Airport, at Columbia Tenn., is rapidly being developed by the Columbia Airlines and two additional pilots have begun service with that firm

An airport commission has been appointed by Laurel, Miss., to develop the municipal airport for which a $50,000 bond issue was recently voted.

Luling, Tex., plans to purchase 100 acres for the development of an airport

The municipal airport at Cocoa, Fla., is now lighted for night flying

West

A $90,000 hangar for Curtiss Wright has been completed at the company's 160 acre field near Oklahoma City The building measures 146 x 154 ft., 6 m Field equipment in addition to the hangar will cost about $55 000, it is said, and the land cost in the neighborhood of $500 per acre.

Crouse-Hinds has been awarded the contract to light the Tucson (Ariz.) Municipal Airport. Among the equipment to be installed will be a 4 000 000 cp beacon seven 24-in floodlights, ceiling projector, boundary and obstacle lights

The contract, which was awarded last month for construction of additions to hangars Nos. 2, 3 and 4 at the Mills Field Municipal Airport, San Francisco, has been rescinded, and new bids are to be asked soon

The Aviation Commission of Long Beach Calif., is considering preliminary sketches of L. J. Waller, of Los Angeles, for the proposed Long Beach Municipal Airport.

Blackwell, Okla., is about to begin the construction of a $25,000 airport and is taking bids on materials.

Conditioning of an airport site at Buena Vista, Colo., started early this month.

North Central

More than 1,000,000 ft. of concrete runways and taxi strips have been completed on the Wayne County Airport near Detroit When completed the airport will include an area of about 1 mi square with six parallel runways extending southeast, four running north and south, and four running east and west All runways are of 8 in concrete mix with wire mesh two inches beneath the surface About 200 miles of 4-in lateral standard drain tile will be installed

Central

Plans have been approved by the Joliet (Ill) Park Board, for a 150 x 104 ft hangar, costing about $60 000 On the first floor will be a 19 x 15-ft office, a 43 x 42-ft. waiting room a mail handling room, and a baggage room, each measuring 19 x 8 ft. On the second floor will be quarters for pilots. On the third floor will be a dining room for banquets and party purposes A $200 000 bond issue is to be used to finance the hangar and other airport improvements Youngberg, Brown & Youngberg airport engineers of Chicago, are in charge of the development

Condemnation proceedings instituted last November by the city of Moline to acquire a municipal airport will be dismissed following agreement of the owners of the land on which the present airport is situated to sell at a reasonable price. About 200 acres, which will be ready for use within a short time are to be conditioned

Lease of a tract of land measuring 300 ft square, near the northeast corner of Port Columbus to the Government for a radio beacon station has been authorized The rental will be $1 a year The station will cost $15 000 to install and $3,500 annually to maintain

The Board of Park Commissioners of Wichita, have called for bids on the new administration building at the municipal airport The estimated cost of the structure is $200 000

Wooster Ohio, has purchased forty nine acres of land for $10,776 on which the city will erect a municipal airport

Bids have been authorized for the construction of a $200 000 administration building at the Wichita Municipal Airport

New York-Atlanta Mail Service to Be Increased

BROOKLYN (N Y)—Increase in service over the air mail route operated by Eastern Air Transport, effective April 1, will mean the operation of six planes daily between New York and Washington, four planes daily between New York and Atlanta, and will give air mail service to Charlotte, N C The northbound route from Miami and St Petersburg to Atlanta will be flown at night instead of in the daytime

As a result, mail from Florida points will reach New York in one night. Planes will leave New York for Atlanta and intermediate points at 3 p m and 9 10 p m., and for Washington at 4 45 a m Northbound planes will leave Atlanta at 8 p m and 12 45 a m, while the northbound plane from Washington only will leave at 8 p m daily The revised schedule will also mean that transcontinental mail from cities south of Richmond can reach the Pacific Coast in two nights and one day.

T.A.T.-Maddux Deficit

(Continued from page 660)

the company included 23 tri-engined transports and four Condors The present rates are considered "frankly experimental."

The income account statement is as follows

Operating revenue		$479 479
Operating expenses		
Maintenance and depreciation of airfields, airways and structures	$188,032	
Maintenance and depreciation of equipment	434,752	
Traffic expenses	314 789	
Transportation expenses	579 410	
Miscellaneous operations	754 173	1 771 158
Net operating loss		$1,291.679
Miscellaneous income		
Interest and discount	113 224	
Other	12 365	143 590
		$1 148,089
Deductions from income		
Loss of Maddux Inc., automobile distributor	$3,045	
Other	2,775	5 810
		$1 153 908
Less Minority interest of Maddux Air Lines Co.		7.297
		$1-146,611
Deficit Interest earned from Jan. 1 to July 8, 1929		160 010
Net deficit from operations		$986,591

St. Louis Board Adopts Program

ST LOUIS, (MO)—The Air Board of the St. Louis Chamber of Commerce has mapped an extensive program for 1930 Activities will include a study of air mail service with a view to extending routes both east and southwest of St Louis; concerted movement to develop plans for a downtown airport campaign in public schools to create a greater interest in aviation and an industrial drive to obtain new aviation industries The board also plans to continue its efforts in Congress to secure adequate appropriation for Scott Field Government lighter-than-air station

Airway Briefs

Paul E. Grosfils, Air Union manager for Great Britain will represent the company in the United States this summer with offices at 24 W 59th St., New York, N Y. Air Union is a co-operative organization established by Sabena, K L M. Aeropostale, A B A, and Farman lines.

Phillips Petroleum Co has contracted to deliver 5,000 gal of gasoline to the fourteen Universal bases throughout the Middle West

Stout Air Lines is said to be considering establishment of a Chicago-New York service, with stops at Detroit, Cleveland Rochester, Syracuse, Albany and Buffalo.

City of Tampa, Fla., is issuing 760 $1,000 bonds, with 30-year term to finance the municipal airport.

It is thought that a series of minor fires at Newark Airport last week were of incendiary origin

Northwestern Aerial Prospectors Ltd, Stewart, B C, will operate an aerial taxi service for miners and prospectors this summer

Aviation committee of Fort Worth (Tex) Chamber of Commerce plans to make a moving picture film of activities at the municipal airport

The municipal airport of Marion, Ohio, has been leased to Sycamore Airport Co, Sycamore, Ohio, for one year at a rental of $500 with option of renewal

Wellesley, Mass., has voted against a proposition to establish a municipal airport.

Royal Airways Corp, Madison Wis, has agreed to maintain Royal Airport as a municipal airport, with provision for landing of mail planes without charge in return for payment of $4,800 yearly by the city

Fairfax Airports, Inc, Kansas City Kan, will pay a dividend of $0 25 per share March 31. The company has just offered 20,000 shares of no par value stock through A A Durante & Co. Inc, at $18 50 per share

Western Air Express has erected a 75-car garage at its Los Angeles airport for the convenience of its customers where cars may be left for the length of a trip

During the first 30 days of operation at reduced rates, Universal division of American Airways, Inc, carried 3 013 passengers, as compared with 1 060 passengers during the preceding month

Boeing Air Transport, Inc, has signed a contract for use of the North Platte (Neb) Municipal Airport for 10 years at $1 500 per year, with option for renewal up to 50 years

Fort Worth-Dallas base of Curtiss Wright Flying Service will be formally opened April 1.

On March 15, there were about 1 450 beacon lights in operation throughout the United States, according to an announcement by the Aeronautics Branch

City Council of Columbus, Ohio, has authorized Service Director Duffy to lease for two years a part of the municipal hangar to Golden Eagle Aircraft Corp for $75 per month the first year and $200 per month the second year The rest of the hangar will also be leased.

Radio range beacons at Fort Crook Neb., and North Platte, Neb., are nearing completion, and the beacon at Cheyenne, Wyo., will be in operation in late April or early May

Boeing Air Transport Co paid its February gasoline tax in Wyoming under protest and will file suit to recover contending that gasoline used in interstate commerce is not subject to state tax

The airport at Gulfport, Miss., was dedicated March 22.

Park Board of Joliet, Ill., will offer a $200 000 bond issue April 7 to raise money for purchase of a 178-acre airport site west of the city

The weather bureau at Wichita, Kan., will be ready for operation April 1

After two months trial of a Claude Neon beacon on the roof of the Hudson Bay Co's store at Winnipeg, Canada the company has ordered two more beacons for its stores at Vancouver and Calgary

Teletype service is being installed at the Springfield, Ill., airport.

Kinner Airplane & Engine Co has leased space for a repair depot in the American Eagle Aircraft Corp hangar at Fairfax Airport, Kansas City, Kan. W. S. Allison will be in charge

Seven-passenger Flamingo planes are used on the Oklahoma City-Wichita route operated by United States Airways.

A recent survey by the Woman's Department of Curtiss-Wright Corp indicates that 23 per cent of passengers on American air lines are women

West Coast Teletypes Started

OAKLAND (CALIF)—The Oakland-Portland teletype circuit was placed in operation early this month This adds thirteen weather reporting stations reporting to Oakland, which also is central weather station for the Oakland-Los Angeles and Oakland-Reno airways On March 20 the local radio weather broadcast was changed from an hourly to a 15-min schedule as follows Oakland-Portland airway, on the hour; Oakland-Los Angeles airway, on the quarter-hour, general California summary and four-hour general forecast, on the half-hour; and Oakland Reno airway on the three-quarter hour

Start New Tulsa-Wichita Line

KANSAS CITY (MO)—Twice daily round trip service between Wichita, Kan, and Tulsa, Okla, has been inaugurated by United States Airways This line will later be extended north from Wichita to connect with the company's Kansas City-Denver passenger line at Hays, Kan Planes now leave Wichita at 10 30 a.m. and 3 15 p m, while northbound planes leave Tulsa at 8:00 a.m. and 1 05 p m. The trip is made in 1 hr 30 min

N. E. Airport Conference Held at Providence, R. I.

PROVIDENCE (A P)—The New England Regional Airport Conference, sponsored by the Aeronautical Chamber of Commerce, met here March 17, with an attendance of about 45 A. P. Tahaferro, Jr., chief of the Airport Section, Aeronautics Branch, was the principal speaker at the opening luncheon Of particular interest was his assertion that seaplanes are due for a great proportional development for transport use, and that facilities should be provided for them wherever possible

Afternoon sessions, held in one of the conference rooms of the Providence-Biltmore Hotel were opened by Lieut-Herbert H Mills manager of Hartford (Conn) airport and chairman of the Conference Homer Bennett, representing the Aeronautical Chamber of Commerce, acted as secretary The first speaker was F N. Davy, vice-president of Barber & Baldwin, New York, N Y, who discussed Airport Insurance Problems He pointed out that an airport owner or lessee is liable for any injury or damage to the general public which may be attributed to his negligence or the condition of the field The cost of a policy covering this liability depends entirely upon local conditions, but in the discussion after the speech, Mr Davy said that $250 would be the minimum premium for a $25 000/$50,000 liability policy In reply to a question as to the possibility of lower rates, he said that his company had paid out more to cover losses than it had received from premiums in the field of aviation insurance, during the past year

State Regulation Discussed

Capt. C M Knox, Connecticut State Aviation Commissioner, spoke on Some Phases of State Regulation of Aviation. He held that the state is able to provide a much closer check-up as for example in obtaining a history of applicants for pilot's licenses through the State Insurance Commissioner, if the applicant has ever carried life insurance Regulation of airports, in the view of Captain Knox, should be by a combination of federal and state law, enforced by municipal police

Airport Radio Facilities were considered briefly in a speech by F N Willetts, commercial radio engineer of Western Electric Co Mr Willetts outlined the limitations which are imposed by the restricted number of radio channels available, and said that many airports might be expected to transmit with such low power that signals would scarcely be audible beyond the actual field limits This would be sufficient for furnishing landing instructions, and would make it possible for all airport stations to use the same frequency, to the great convenience of pilots This is already envisaged in the rulings of the Federal Radio Commission, which assigns one other frequency for the general use of aircraft.

FOREIGN ACTIVITIES

Britain's Air Budget Increases $4,450,000

LONDON (ENGLAND)—The net total of Britain's Air Estimates for 1930 is $89,250,000, an increase of $4,450,000 over last year's figures, including a supplementary estimate $3,800,000 [See AVIATION for March 22 for discussion of supplementary estimate]

The chief features of the 1930 R A F Estimates compared with those of 1929 are

1929		1930
32,000	Numbers	32,000
$17,045,000	Pay	$19,655,000
8,380,000	Quartering stores etc	8,675,000
34,770,000	Technical and warlike stores	37,080,000
9,320,000	Works buildings lands	9,600,000
2,780,000	Auxiliary and reserve forces	2,855,00
2,055,000	Civil aviation	2,305,000
3,305,000	Air ministry	3,375,000

The increase in civil aviation corresponds with further anticipated developments in civil air transport. While modest, the increase is proportionately higher than the increase in Service appropriations

Airships Satisfactory

Commenting on the two new airships, Lord Thomson says that the trials of the R 100 and the R 101 have shown a satisfactory measure of success, despite delays inevitable in a field so novel and experimental Both airships have proved to be thoroughly stable and easy to control.

Provision is made in the Estimates for the carrying out of a program of overseas flights between now and April, 1931 The intention is that R 100 should in the late Spring or Summer carry out a flight or flights to the tower erected at Montreal and during the winter should operate between Cardington and Egypt R 101 is to fly to India and back in the Fall, and will then be used for experimental operation on the Indian route in order to obtain the data necessary before a commercial service on this route can be established.

Generally speaking these Estimates allow for a broad continuity of air policy For the coming year, however, the approved increase of the Royal Air Force, is of small dimensions, and is designed to demonstrate once more the earnest desire of the Government to avoid disastrous competition in air armaments With this object in view the Home Defence Force will be the main feature of the 1930 program and the only new unit to be added to that force will be one non-regular squadron

A torpedo-bomber squadron which was originally formed as an experimental unit has been reorganized for normal

(Concluded on page 685)

Raynoil Maps in New Form

LONDON (ENGLAND) — Sectionized maps covering England and Wales are being made by Raynoil Maps Ltd and sold through National Flying Services Ltd They are sold in a set of 70 one of which is a key-map which may be seen through the open front box. The map for each section is marked with a tab so that it may be easily located This also shows the numbers of maps covering the surrounding area. The maps themselves are made by the patented Raynoil process, so that they are weather and oil proof, and may be marked with colored pencils and then erased clean without damage The price for the set, with aluminum case is about $51, it is reported

C.A.T. Completes First Year of Service

TORREON (MEXICO)—On March 9, Corporacion Aeronautica de Transportes, S A, completed one year of operations, during which its service had grown from three planes flying 300 mi daily, to fourteen airplanes flying 4,200 mi daily, with ten pilots in the company's employ Seventeen Mexican cities, as well as El Paso and Brownsville, Tex., are served by the line, and concessions have been secured for 1 531 mi of additional routes

Lockheed Vegas are used by C A T., and schedules call for an average speed of 132 16 m p h over all lines said to be higher than that of any other system. Plans are being made for increasing this average to 145 m.p h. The most important line, Mexico City to El Paso, a distance of 1,104 mi., is covered in 9 hr C A T also operates the only transcontinental service in Latin America The line has been developed under the leadership of Theodore T Hull

Caproni 90 Ranks As One of Largest

MILAN (ITALY)—More details have been announced recently regarding the giant Caproni 90 P B which was completed and first test flown here last Fall The machine has a useful load of about 22 tons which may be used for transportation of bombs and high explosives, if used for military purposes, or to carry about 100 passengers if used for commercial airline operations The plane is powered with six watercooled Isotta Fraschini engines of 1,000 hp each It is credited with a high speed of 130 m p h and a landing speed of about 56 m p h

The machine is of biplane construction, the top wing having a span of about 128 ft and the lower wing a span of about 160 ft. The span of the single wing on the Dornier Do X is 157 ft and of the Junkers G 38 is 148 ft It is built of high tension steel tubing The engines are arranged as follows Four on the lower wing, one on the leading edge of the wing on either side of the fuselage and two directly behind these on the trailing edges A pair are slung in tandem between the upper wing and the fuselage Thus three operate tractor propellers and three are pushers

Normal Range 1,200 Mi

The machine is 95 ft. long and 39 ft. high Empty, it weighs about 15 tons The combined wing area is about 6,000 sq ft It has a ceiling of 16,000 ft. and normal range of about 1,200 mi The engines are Vee-shaped with eighteen cylinders The oil consumption per hour is 154 lb for all six engines and the fuel consumption is about 1 700 lb Each engine, including the propeller hub weighs in the neighborhood of 1 760 lb

The big machine has been reported as breaking six world records recently but the results have not been announced as yet

The Caproni fitted out as a bombing plane Note comparative size of men

Foreign Briefs

A proposal to spend $65,000 for a hangar to house the "Plus Ultra" in which Col Ramon Franco flew from Spain to Buenos Aires by way of Brazil five years ago, has met with considerable opposition in Argentina

M R Soreau has been elected president of the French Aeronautic Federation for 1930 Vice-presidents are Mm Sardier, Riche and Renard Henry Chollat is secretary-general, and Mm Couhe, Hirschauer, Dagnaux and Breguet are members of the advisory committee

After seven years, the Aerial Derby a strictly speed contest, is to be revived in Great Britain. It will be run in connection with the King's Cup contest over a 1,000-mi course

Hazards of the airport used by Aero Club of East Africa, Nairobi, include the frequent presence of grazing game on the field

Herr Resch of Wuerzberg Germany, recently made a parachute jump from an altitude of 17,333 ft

A new airport has been established at Delft, Holland, as a base from which to ship fresh vegetables, fruits and flowers

A Gipsy Moth plane is to be raffled by the London Aero Club, with 1,500 tickets selling for $2 50 each

Eight preliminary flights between Paris and Saigon, Indo-China, have bern successfully completed by Compagnie Air-Asie, and negotiations for the establishment of regular air mail service are now under way

During the last year, 228 class A glider licenses were issued by the Rossiten and Wasserkuppe schools, together with 210 in class B and 62 in class C The Rhon Rossiten school has decided to discontinue the class A, and will recognize only class B and C licenses hereafter

Test flights of a tail-first plane developed by Focke-Wulf in Germany, abandoned since a crash in 1927, are to be resumed

Luftdienst Mittelrhein Gm.b.h is the name of a new flying service with headquarters at Erbenheim airport, near Wiesbaden and Mainz, Germany

Rohrbach Metallflugzeugbau has been granted a moratorium by the German government, which holds 82 per cent of the stock, and will continue operations.

Field Aeronautical Corporation of Cuba began operation of a taxi business March 23 with two planes

The first of 300 bombing planes ordered from Italy has been delivered to U S S R.

Government of Panama has ordered circular areas of land with a diameter of three miles set aside in the vicinity of every city and large town in the country for future development as an airport

Comdr Arturo Morino Benitez has been appointed assistant secretary for Aviation in the Chilean Ministry

Donati Makes Altitude Record

ROME (ITALY) — Comdr Renato Donati, who in January established new closed circuit endurance and speed records for light planes of the first catagory (two-seaters), has made a new altitude record in the same category with a mark of 22,252 ft. He used a Fiat A.S 1, powered with a Fiat A 50 air cooled engine of 90 hp The former record of 19 862 ft. was made by a Moth with Gipsy-85 engine

British Air Budget

(Continued from page 664)

service duties with a view to its proceeding to Singapore during the current year In 1930 one flying boat squadron will be formed but the chief developments will be in advancing the equipment of the Force as a whole and of the units which were formed in 1929 in particular Two new flights, which were contained in the Fleet Air Arm program for 1929 and were deferred, are included in the 1930 program It is proposed that a squadron of flying boats should carry out a cruise in the Baltic during the coming Summer Excellent results continue to be achieved by the University air squadrons at Oxford and Cambridge, and the fact that solo flying in term-time is now permitted to members of these squadrons at both Universities has had the beneficial effect of enabling tuition in flying to be maintained at full strength since their formation

The keynotes of the policy indicated by the Estimates are consolidation, scientific and technical development, and continuity in airship progress There will be criticism of the continued limitation of the home defence program to 52 squadrons as the minimum consisted with safety, but no surprise will be felt in existing circumstances The light airplane clubs (thirteen are subsidized) will welcome a promise of continued support This, after present agreements expire, will be on the same basis as that given to National Flying Services, namely, a per capita grant of $50 for each qualifying member The total outlay will be only $100,000, and the advantage to the country is very great.

It is satisfactory to note that what is of paramount importance—research and experimentation—have not been permitted to suffer loss, although it may be remarked that Great Britain spends far less than the United States in this direction

To Erect Hydrogen Plant

PERNAMBUCO (BRAZIL)—There is being shipped here by boat a portable plant to be used for the production of hydrogen with which to service the Graf Zeppelin on its forthcoming visit to this continent Officials of the Union Carbon & Carbide Co of New York City are accompanying the 300-ton plant and will have charge of its operation

Spin-Proof Plane Demonstrated at Berlin

BERLIN (GERMANY) — A demonstration of a plane claimed to be completely spin proof was given recently at Tempelhof The machine was the Focke-Wulf single-engined monoplane for six passengers, which is in regular commercial use between Wilhelmshaven and Rustringen Its unusual qualities of lateral stability were noticed when it was tested for its license by the Experimental Aircraft Institute

With the owners' consent, the chief test pilot of the institute Herr von Koppen, made three further test flights The center of gravity was shifted by the disposition of loads as far forward and as far aft as possible for the first and last flights The pilot's report was that this made no difference to the machine's stability and that he had found it impossible to spin it in any of the flights

Von Koppen stalled the machine several times with the engine full out or throttled back and each time it appeared to return in a narrow curve to a normal flying position He stood it vertically on the wings with the same result. He then flew it low across the airport with the propeller little more than turning over and the nose well up, but in this position it showed no spinning tendency according to the report, and answered readily to the lateral controls He landed very slowly with the engine throttled back The owners do not give details of the manner in which this remarkable stability has been achieved beyond the fact that it is connected with the form of the wing section, which is reminiscent of that of the old Taube type, one of the earliest types of German war craft.

Americans Plan Mexico Plant

MEXICO CITY (MEXICO)—Arrangements are being made by a group of American capitalists for the establishment of an airplane and engine factory at Monterrey, state of Nuevo Leon, according to press dispatches reaching here The Governor of the state and the Monterrey Chamber of Commerce, are said to be interested in the project Fred Hartwig and Ward E Pierson of New York City and H. H. Harris of Chicago have reached Monterrey in connection with the proposition and it is understood they will come here soon to interview President Pascual Ortiz Rubio with a view to obtaining a concession for the factory and a tourist hotel

Shell to Use Planes in Venezuela

PANAMA CITY (PANAMA)—Word has reached here that the Dutch Shell Oil Co in Venezuela has purchased a number of planes for its service in the rich oil section in western Venezuela A fleet of amphibions will be used for operations in the Maracaibo Lake region where transportation now is chiefly by small lake steamers and over rough jungle trails

WHAT OUR *Readers Say*

Revise Stinson Board

To the Editor

I am writing to call to your attention a trend in aviation which I believe if permitted to continue will be extremely detrimental to the industry I have reference to the tribunals for the consideration of aviation litigation

Vessels navigating the water have long been operated under regulations defining equipment, lights, signals, rights of way, etc These have been included into an International Code adopted by treaty by most of the maritime nations of the world and into a somewhat similar set of Inland Rules and Great Lakes Rules adopted by Congress covering navigation on the lakes and within the three mile limit These rules are construed and applied in the Federal admiralty court by trained judges without juries The construction of the rules has therefore been standardized and become known in a general way to navigators at sea.

Likewise in the navigation of the air, regulations are appearing by promulgation of the Secretary of Commerce under the Air Commerce Act. They are also appearing in State enactments Aircraft operating on many planes of the atmosphere will necessarily have complicated rules, probably more complicated than navigation at sea There will be as much, probably more, need than in the admiralty for trained minds to construe and apply the rules, but there has been nothing done to provide a trained tribunal in which litigation based on these rules shall be considered; in fact the States under the Uniform Aeronautics Law are, in the absence of Federal legislation, proceeding with a view to consideration of aviation questions by the multitude of common law judges and juries, who can never become trained in handling such matters This practice will in course of time leave a crop of ill considered and conflicting decisions The Uniform Aeronautics Law will be susceptible to tinkering by 48 State legislations, and after adoption will remain uniform only in name.

It would seem advisable first that the regulations pertaining to aircraft and their operation should be uniform, which can be accomplished only through one Code adopted by the Federal government similar to the Inland Rules on the water, and that litigation based on this Code should be considered by the Federal Court judges without juries in a practice analogous to admiralty This is the trend which has taken place in England where the admiralty courts have been given jurisdiction over aviation litigation as the occasion has arisen

In this country, with our Federal Constitution and States Rights, it is more difficult to work out a practical solution, but it nevertheless can be done and in my opinion should be done before aviation litigation falls into a chaotic practice

In admiralty the benefits of the procedure are so patent that though the injured party always has the option of a common law remedy with or without jury he almost always chooses the admiralty tribunal Such I believe would be the result if a procedure analogous to admiralty were adopted in aviation The need of trained judges to determine such matters is as necessary in one as in the other, it is likewise obvious that a jury of tailors and haberdashers is wholly unfit to render a decision involving aerial navigation.

If aeronautical circles are in favor, I have no doubt that the Aviation Committee of any of the National Law Associations with the assistance of a Committee from Aviation Societies will be pleased to draft bills for submission to Congress with a view to the adoption of a well considered code of Air Navigation Rules and to provide remedies analogous to admiralty and a trained tribunal to handle litigation based on these rules

Foye M Murphy
Blodgett, Jones, Burnham & Bingham, Boston Mass

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Cut-throat Competition

To the Editor

I think that unbeknown to them a very serious danger threatens the continuous advancement of the technical development of equipment for the Army Air Corps and for Naval Aviation. I refer to the present cut-throating competition between qualified manufacturers for government contracts The situation as it stands today, I assure you, implies that manufacturers are operating on these contracts without profit

This is a situation which obviously cannot continue for long without disaster to the backbone of the supply sources of aviation materiel for the Army and the Navy but aside from this obvious conclusion there is another which should not be lost sight of in any attempt which may be made to rectify the present situation That is the fact that the continued advance in the technical aspect of aviation implies the maintenance by the various companies of experimental departments which will be worthy of the name. You know all too well that there is very little in the industry today which promises the early achievement of experimental departments corresponding to those maintained by the leading companies of other older industries Take General Electric for example. We all know to what extent they are prepared to devote large sums in the interest of technical improvements How is it that this company is able to make such large appropriations for experimental purposes? Simply and solely because in the course of years out of *profits* they have set aside sums to build up a large surplus

There are practically no corporations in the airplane industry today which have surpluses. How are they going to build up these surpluses? Out of profits, of course But if the responsible directing and contracting officers of the Army and Navy Air Services persist in their attitude that the securing materiel at cost or near cost by the Service is a smart thing, there will be no surpluses in the aircraft industry for a long time to come and therefore, there must be a complete cessation of experimental work.

B F Castle *President, Great Lakes Aircraft Corp*

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In Praise of American Airlines

To the Editor:

I have just read an article in your issue of January 4th by Lieut.-Commander Wead entitled "The Important Matter of Confidence and the Air Passenger" and I must confess to being more than mildly surprised at your publishing anything so destructively critical and at the same time, in my poor opinion and experience, so very untrue

Indeed I am inclined to hope that Aviation is only read by the trade and not by the general public not for your sake, Mr Editor, but for that of air transport itself

The writer of the article in question has picked out four groups as illustrating American air transportation I, if permitted would like to add two other groups to this list

My group No 1 With the purpose of utilizing American Air Transport lines for the first time I booked a passage from New York to St Louis over the New York Central Universal System Arriving at Cleveland early in the morning by train I found a car waiting to take me to the flying field, there, upon producing my "ticket several yards long'—but not as long as a railroad ticket—I was given a seat, one of the most comfortable seats I have ever sat in whether in plane, train or car, and handed several morning papers and magazines very nicely presented in their leather bound covers Incidentally I did not bother at all with my baggage and it was apparently as far as I was concerned taken care of automatically Weather conditions were extremely bad, but in spite of this a start was made at the scheduled hour

After flying for about 30 minutes the weather became worse necessitating the plane's coming down from an altitude of 2,000 ft to 50 ft In coming down one noticed no sensation of diving or of being thrown out of one's seat, nor did one have to brace oneself to avoid falling. On the contrary it seemed to me that to one who had never flown before the difference in altitude would hardly have been perceptible The forced landing was effected with extreme skill under most appalling conditions of thick fog clouds and torrents of rain

Immediately the plane stopped a passing automobile was commandeered by the chief pilot, my baggage packed into it by the cabin boy, and I was taken to the nearest railroad station—which happened in this case to be that of a small village of approximately 3,000 inhabitants The pilot asked the time at which the next fast train passed through going in the direction I wanted—it was about half an hour later—then, producing the necessary authority from his pocket, arranged to have that train stopped for me This enabled me to make a connection at Chicago and to arrive at St. Louis the same night with a loss, in spite of the very adverse weather conditions, of only a few hours, *thanks entirely to very high efficiency and perfect coordination between the various branches of the service*

My group No 2 I bought a ticket from St Louis to New York over the same system. Leaving St Louis at 12 45 p m I arrived at Chicago ahead of schedule, having incidentally averaged 131 m p h While waiting for the connecting plane for Cleveland, the Kansas City-Chicago plane arrived this having averaged 182 m p h On leaving Chicago 4 00 p m. (Central Standard Time) an excellent trip was made and we arrived at Cleveland 7 35 p.m. (Eastern Standard Time), again ahead of schedule by 10 minutes. Here I must mention that having taken the trip in the month of November more than 60% of it was accomplished in complete darkness

While on board every possible convenience was done for the comfort of the passengers, from the usual supply of papers and periodicals, writing paper, etc, to hot coffee and sandwiches gratis, and one had the pleasure of several visits from the second pilot who, acting in a somewhat similar capacity to that of a Staff Captain of a transatlantic liner, occupied himself largely with the comfort of the passengers

I would like to add here that I have been piloting continuously since 1915 and have done and am continuously doing considerable travelling on European air lines And it should also be borne in mind that American air passenger transportation has only been in existence for a few months, whereas European air transport lines have been operating for a considerable number of years completely subsidized by their respective governments

Air passenger transportation is at present a vast field of the utmost importance to Aviation and it will become in the near future one of even greater importance, but one disagrees entirely with Lieut.-Commander Wead that to take a trip on an air line as it is organized in the United States today tends to discourage the public from using these lines

On the contrary I am convinced, and it has always been my experience, that, out of ten members of the general public who can be persuaded to go into the air for the first time, nine will become habitues

Surely it is the job of everyone in Aviation to encourage air transport and not to let us be discouraged by a few odd examples from one who, "after some years of active flying has, of necessity, drifted into other channels"

After reading Lieut Commander Wead's article I could not help thinking of a story my father often tells.

He was going along the road in London some years ago when he saw a man walking in the middle of the road and carrying a red flag, everyone scattered to right and left Coosiderably astonished my father asked a passer by for an explanation "Oh one of those new-fangled motor-cars is coming along behind him and he has to clear the road first It serves them right if someone gets killed, such thinks are against the laws of nature, I think, they weren't meant to be "

Not that Lieut Commander Wead reminds me of the passer-by but is he not perhaps waving the red flag a little too energetically?

Cyril Turner,
Boulogne, France

[We are exceedingly glad that Captain Turner, who is well known to many Americans and especially to those who have done aeronautical business in Paris, has received such a uniformly pleasant impression of American air transport We might, in fact, consider that the publication of Commander Wead's criticism had been justified in serving to bring out Captain Turner's testimonial However, we cannot accept the implication that it is unfair or improper to make severely unfavorable criticisms upon current operations wherever they seem to be warranted. The conditions of which Commander Wead complained are by no means universal, nor even general, nor did he so suggest The operations of air transport companies, like other commercial activities, are of variable quality, and most of us who have traveled extensively by air have had some radically unfavorable impressions to mix with pleasant ones To call attention to the errors that have been made or are likely to be made is, we believe, a greater service than to engage in undiscriminating applause We repeat, however, our hearty satisfaction in being able to print Captain Turner's communication —Ed.]

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Airlines Over French Colonies

[The following letter comes from Mr D O Baudouy, American representative of the Compagnie Géoerale Aeropostale, or Latecoère Air Lines the operations of these lines in Europe, North and West Africa, and South America were described in an article in Aviation for February 1, compiled from information supplied by Mr Baudouy It comes in response to a personal letter from the Editor of Aviation who expressed profound regret at the report then appearing in the daily press that the French Government would stand in the way of the free development of air transport in Latin-America by refusing American companies the right to pass over French Colonial territory unless they gave special and extraordinary privileges to the Compagnie Générale Aeropostale Mr Baudouy, as will be seen from his letter, denies the correctness of the statement of his government's attitude and of the interpretation placed thereon.—Ed.]

To the Editor:

I duly received your letter of the 11th inst and I believe I must write to you to try to dissipate the impression under which you appear to be

Quite a good deal of nonsense and untrue statements have appeared in the Press lately regarding the question of flying rights over the French Colonies of the West Indies and Guiana and I am not surprised at the uneasiness which people, who have at heart the interests of Aviation, may have felt.

Statements placing the French Government and Compagnie Générale Aéropostale in the light of the villain or rogue trying to squeeze American Air-Transport Companies and to prevent, through a refusal to grant the right to fly over some of the French Colonies, an economical expansion of American interests in South America, are too ridiculous to be true and can have no other purpose than to mislead Public Opinon and create an atmosphere of unpleasantness However we must not forget that when it comes to Aviation people are inclined to be prompt in "going up in the air" and little attention should be paid to such statements as any one who has come in contact with Officials of the French Ministry of Air or of the large French Air-Transport Companies, know that they do not agree with the broadmindedness and sportsmanship shown by them at all times in any matter con-

nected with Aviation. Col Lindbergh, Admiral Byrd and lately the aviators Larre-Borges and Challes can vouch for this

Of course it is not my task to defend the stand taken by the French Government but I know that the circumspection shown in granting flying rights over the French Colonies of the West Indies and Guiana is not based on a fear to see American firms in a much more advantageous position in competition with European business houses, as the public was led to believe, but is merely due to the fact that the French Government subsidizing Compagnie Générale Aéropostale and having a large interest in this Company, considers it only logical to grant such flying rights to Companies which are willing to play a fair and square game of ball with Aéropostale and operate in harmony in South American countries where Aéropostale has done all the pioneering work in connection with Air Lines

Neither the French Government, nor Compagnie Générale Aéropostale, are afraid of competition provided it is a constructive one As is tha case for other means of transportation either in the domestic field or in the international one, (Railways, steamships, etc.) competition can only be constructive if there is between competitors a true and genuine co-operation which can lead to improvement in service, speed, efficiency, etc. This co-operation is, as far as I know, the only thing which the French Government and Compagnie Générale Aéropostale are asking from American Companies and you will admit that that is not the obviously impossible conditions which were represented.

As far as Compagnie Generale Aéropostale is concerned, I can state here positively that this Company has never asked from any American Company to provide airdrome facilities in South America and to grant it free use of these facilities, as stated in the New York *Times* of February 7th, 1930, nor has it, as stated in the New York *Times* of February 9th 1930 "Speaking through the French Government, made an agreement contingent upon an American promise to carry mails for the French Company wherever this would be to the advantage of the French concern."

On the contrary, when approached, during 1929, by an American Company with a view to help in establishing as quickly as possible an Air service between the United States of America and Argentine, along the Atlantic Coast, Compagnie Générale Aéropostale did not hesitate to express its willingness to enter into a tentative agreement with this American Company and to place at its disposal the use of its 20 landing fields located between Natal and Buenos Aires. Temporary rights to fly over and stop at the French Colonies of the West Indies and Guiana were obtained for a period of two months from the French Government.

It may be that the present attack against the French Government and Compagnie Generale Aéropostale is due to the fact that at the expiration of the delay of two months the flying rights were not renewed by the former and the use of the landing fields was withdrawn by the latter, but the American Company should know better

For almost two years I personally have endeavored to convince American Companies contemplating to operate Air-Lines in South America and long before they started such operation, that it would be in the interest of all Companies concerned to enter into a working agreement whereby tariffs, schedules and all other matters of interest to each Company would be taken in consideration and worked out in close co-operation, and nothing has given me more pleasure than the article published in the issue of AVIATION of January 25th under the caption "The Place for Unity" in which you develop the same ideas

But instead of Unity what do we see at tha present time? Two American Companies engaged in a keen rivalry and competition in South America and giving vent to their feelings with such an animosity as not only to surprise South Americans but even to begin to somewhat alarm Americans themselves

And which could be the attitude of the French Government and of Compagnie Générale Aéropostale, in face of such circumstances, if not one of circumspection and expectancy.

These are, very frankly outlined, my views on the subject which interests you I hope you will find them reasonable.

D O BAUDOUY
D. O. Baudouy & Co.,
New York City

[We greatly appreciate Mr Baudouy's willingness to present his views so fully and frankly, but this authoritative statement of the French position still leaves us somewhat concerned It still implies that the right to fly across national territory is a proper subject of commercial negotiation with individual commercial enterprises, and may be granted or withheld, in return for commercial concessions, to companies which in Mr Baudouy's own words "are willing to play a fair and square game of ball and operate in harmony" It remains our own view that the right of passage through the air should be universally recognized, subject of course to reciprocity between governments or reprisal against those which have not accepted the principle, and that international air traffic should be subjected only to the minimum of control indispensable in the interest of safety —Ed.]

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Marking Towns

TO THE EDITOR

Referring to your editorial "Marking Blankville" in the December issue of AVIATION, I think that it is high time that definite steps were taken toward having every town of any size, and smaller towns if they are on travelled airways and not near larger marked towns, properly marked for the air traveller

Flying from Wichita a short time ago I lost my way and had to come down within a hundred feet of the housetops to read the name of a town on the railroad station That endangered my life and the lives of the people who might have been hit if my motor had quit at that psychological moment.

Marking a town for the airmen is such an easy thing to do, and so inexpensive, that it seems to me every town in the country should be willing to help aviation at least to this extent And for the time and money expended no greater help could possibly be rendered.

I don't quite agree with you that in most cases a town receives no direct advantage by properly marking it for the pilot and air traveller Many a time, flying over California wherein the Standard Oil Company has marked many communities, I have blessed the oil company for its thoughtfulness and remembered the name of the town when I never would under any other circumstances If a town is adequately marked practically every pilot, and many passengers, will see the name and that is worth a lot to any community

You're right in your statement that "no chapter of the National Aeronautical Association should rest easy so long as an unmarked town is within fifty miles of its headquarters." And, frankly, I think the N A A could be more aggressive in following up its various chapters to see that this is done

With human nature as it is, I doubt whether the air marking of communities will become general until it is made compulsory and I sincerely hope that this will soon be the case, and in this wish I know that I am joined by my brother pilots

EAGLE OVINGTON
Santa Barbara, Calif

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The Right Kind of Publicity

TO THE EDITOR

Thank you for the editorial article on "Publicity That Helps the Industry" (from AVIATION, for Dec 14 1929).

It is really to be regretted that the average newspaper reader, and not one of us is an exception, likes to read sensational stories with our morning coffee. Ordinary news regarding aviation holds the interest of those directly connected with the aircraft industry but does not appeal to the layman There are so many interesting but not sensational flights being made every day, which if written up in the right manner and broadcast in the newspapers, would do more than anything else to educate the general public and give them the confidence to use the air lines more than they do at the present time

I can cite a few instances which to me are most interesting, but I doubt if more than a half a dozen people ever heard of them.

One is a flight Ralph Lockwood, then with the Fairchild Airplane Company, made several months ago all over the Western states accompanied by his wife and daughter. It was interesting to me to hear him say that on long jumps of from three to five hours his daughter Marilyn would play around the cabin for an hour or so and then lie down on a pile of cushions and sleep the remaining hours of the flight Ralph flew from New York to Los Angeles, then north to Seattle, then across to St Paul then to Chicago and back to New York

Another case is James M Johnson better known as "Jimmy" Johnson who is a sales pilot for the Buhl Aircraft Company of Marysville, Michigan Last summer he flew to Toronto several week-ends with his wife and three small children, and he often takes his wife on flying trips to New York, and at present she is with him on a trip to Los Angeles and back

This is an example of only two cases and there must be hundreds of them all over the country

Quite a number of the newspapers have aviation editors, who, I really think are trying to get the aviation news into the papers in the right way but as you say a great many accidents are laid to the "Tail Spin" that may be caused by other things

Another sensational news item is that such and such a plane caught fire hundreds of feet in the air and plunged to earth in a flaming mass, whereas if the truth be known it would reveal that the plane fell from some unknown cause and caught fire after it crashed. Still another error that the newspapers make is that such and such a plane fell from so many thousand feet and crashed, whereas, in nine chances out of ten the plane was under control until it was very close to the ground, but the nature of the landing field was such that a good landing could not be made and a crash was the result.

Accidents are bad enough but if a plausible reason is given for the crash the average layman would understand and by getting the proper outlook would gradually outgrow his timidity for flying

WALTER E LEES,
Aeronautical Service Engineer,
Packard Motor Car Co

[It is hardly possible for us to make editorial comment on the above letter, because we so very completely agree with every word of it We hope that his sentiments on publicity and on the value of safe and sane flying and the necessity of disseminating information concerning it will be generally taken to heart —Ed.]

Editorial Comment

FROM THE DAILY PRESS

Relative Safety

PROBABLY, and almost certainly, most people think less of danger when traveling by auto than when traveling in any other way. Some people never think of danger in any form of travel And there are some who may have a special fear of auto travel or of some other particular form of travel because of personal experiences, but most persons today travel more by auto than otherwise and everybody tends to feel that what is most customary is most safe

We do not think of the automobile accidents of which we have heard when we step into an automobile but those of us who travel little by train may think of railroad accidents when we board a train, those of us who have traveled little or not at all in the air or on the ocean will be pretty apt to think of airplane accidents and steamship wrecks when we step into a plane or board a vessel

Comparative safety is something we can ascertain by studying the figures, but our feeling of comparative safety depends upon custom and personal experience and, on this account, while we are hardened to automobile accidents and pass over the daily news of them as indifferently as we do the deaths of strangers from old age or disease recounted in the obituary columns, we read of a shipwreck or an airplane disaster with a shudder of apprehension and our imagination pictures it for us with realistic details and in undimmed colors.

NASHVILLE TENNESSEAN

Abstracts AND *Reviews*

Wing Strength

THE TORSIONAL STRENGTH OF WINGS. *By C P Burgess, N A C A Technical Report No 329*

IT IS NOW generally conceded that the placing of strong drag bracing near the top and bottom surfaces of a wing is advantageous structurally, and the idea has already been utilized in several modern designs Up to the present time, however, no reasonably simple method of calculating the contribution of such a system of drag bracing to the torsional strength of a wing has been known This report describes a means of calculating the torsional strength of wings having efficient drag bracing The method is applicable to both two-spar and multi-spar construction

The elastic axis or centroid of the wing is defined as the line across which a transverse force may be applied without causing any rotation of the wing section The position of this axis from the leading edge may be calculated by taking the sum of the moments of inertia of the spars at the section under investigation, multiplied by their respective distances from the leading edge and dividing this sum by the sum of the moments of inertia. For convenience the resultant force acting on the wings should be divided into forces acting through the elastic axis and a pure torsional couple For wings with negligible shearing deflections which is the usual case, if the resultant of the load normal to the chord passes through the elastic axis, there is no rotation of the wing sections, and, providing the ribs are rigid, all spars have equal deflections and are loaded in direct proportions to their moments of inertia The running load, w, on each spar due to a total running load, W, acting through the elastic centroid, is given by $w = MIs/\Sigma Is^2$ where s is the distance of the spar from the centroid.

To calculate the stresses the principle of least work is applied The stress, S, in any member of the structure, due to the unit torsional couple, M, is given as $S = S_o + XS_x$, where, S_o is the stress resulting from the couple M opposed only by the spars of the determinate structure The other part, XS, results from the forces in the redundant drag bracing X is the fraction of M resisted by the drag bracing; and S_x is the stress resulting from an imaginary condition of internal forces in which the spars and the drag bracing act against each other in torsion with an intensity equal to $-M$ in the spars, and $+M$ in the drag bracing Or S_x equals $-S_o$ plus the stress due to M applied to the drag bracing

X is then the only unknown quantity

The total internal work is designated by W and is given by $W = \Sigma(S_o + XS_1)^2 L/2AE$ where L is the length of section under consideration A is

the cross-sectional area of the members at that section, and E is the modulus of elasticity of the material X can then be obtained from the equation derived from that for W

$$X = \frac{\Sigma US_nS}{\Sigma US^2} \text{ where } U = L/A$$

To illustrate this method of analysis, the stresses at a section of the large steel tubular, three-spar wing of the Huff Daland XHB monoplane were calculated As a check of the validity of the method the calculated stresses were compared with those measured by strain gages when the wing was static tested Errors introduced by the inaccuracies of the electric telemeter strain gages prevented a very close check of results, but comparison of the figures indicated that the theory was more accurate than the method of measuring the stresses in this test

The torsional strength of a wing determines very largely the distribution of air forces upon it, and the tendency to flutter Insufficient torsional strength produces wash in or an increasing angle of attack toward the wing tips in the high incidence condition. further increasing the load on the front spar in the condition which is already most severe Conversely, torsional yielding in the low incidence and nose dive conditions produces washout of the wing shape and may exaggerate the critical condition for the rear spar The mathematical theory of the forces producing flutter is not yet sufficiently far advanced to determine by direct calculation the critical air speed at which flutter will commence Comparison with successful practice must still be the principle criterion upon which to judge the adequacy of the torsional strength of a new design of a wing To facilitate such comparison Mr Burgess derives a coefficient for torsional rigidity, $C_t = M\ dL/L\ q\ F\ b\ d\Theta = M^2/2W_qFb = M^2/2Fb\Sigma EA/S^2L$, where M is the torsional bending moment, Θ is the angular twist in length L, q is the aerodynamic head, F the wing area, b the chord, W the internal work, E the modulus of elasticity, A the cross-sectional area and S the total stress

This coefficient when applied to the XHB wing with and without drag bracing shows a torsional rigidity six and one-tenth times greater with the drag bracing than without it This emphasizes the importance of an efficient drag brace system in improving the torsional rigidity of a wing

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Water Pressure on Floats

WATER PRESSURE DISTRIBUTION ON A TWIN-FLOAT SEAPLANE *By F. L. Thompson, N.A.C.A. Technical Report No 328*

AT THE REQUEST of the Bureau of Aeronautics, Navy Department, the N.A.C.A. undertook a series of investigations to determine water pressures on various types of seaplane floats The first investigation, reported in Technical Report No 290, was conducted on a UO-1 single float seaplane. The present work covers a twin-float type, and a future investigation will be devoted to a boat-type seaplane.

The object of this research is to determine the magnitude and distribution of water pressures on seaplanes when landing or taxiing on either smooth or rough water Up to the present time little has been known regarding such pressures and it was believed that a better knowledge of the subject would permit of the design of stronger floats while at the same time accomplishing a reduction in weight.

A TS 1 twin-float seaplane was used for the investigation. This machine has a gross weight of 2,123 lb The floats were of V-type and were constructed of wood The instruments used were those necessary to obtain the pressures, the acceleration of the c.g. of the airplane normal to the thrust line, the accelerations of the float bottom, the longitudinal angle of the float, and the air and water speeds. Both positive and negative pressures were measured The maneuvers included taxiing at various attitudes and speeds up to get away, stalled landings with power off and power on, fast landings, pancake landings, and porpoising.

The highest pressures occurred in pancake landings, very fast landings and in fast taxiing runs Pressures as high as 10.5 lb per sq in were obtained the maximum occurring at the step except for hard pancake landings with the stern well down when the stern and bow were also heavily loaded The maximum pressures did not occur simultaneously over the entire float bottom, but were confined to a small portion of the bottom at any particular instant, and lasted only one-twentieth to one one-hundredth second Sustained pressures of lower magnitude but distributed over a large area were also measured and found to run as high as 5.7 lb per sq in near the step The only part of the float on which no large pressure occurred was a limited area immediately abaft the step in which a maximum negative pressure of 0.87 lb per sq in. was measured

The greatest acceleration of the c.g. normal to the thrust line was 4.3 g obtained in a pancake landing. A value of 4.5 g would not likely be exceeded in a safe landing

The data obtained, though only approximate in many cases, was sufficient for the derivation of approximate load distribution curves for the worst landing conditions and these might be used as a guide in static tests. It should be remembered, however, that the results given apply only to the particular seaplane tested, and that variations in weight and speed of the machine and in shape of the floats, would probably produce considerable variation of both the magnitude and distribution of pressures

New Patents

Bomb Sight

1,745,995 BOMB SIGHT GRANDISON GARDNER Honolulu Territory of Hawaii and CHARLES L. PAULUS, Dayton Ohio Filed July 31, 1924 Serial No 729,388 17 Claims (Cl 33—48.5)

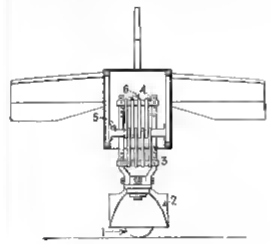
THE ENTIRE sighting mechanism is suspended like a pendulum from a support by a universal joint Ground speed is set by a sighting wire which is movable vertically and is sighted on a spiral which is rotated in a horizontal sight opening at constant speed The observer adjusts the sighting wire until a given point sighted on the spiral moves backward at the same speed as a point on the ground Altitude is set by a wire movable along a horizontal scale, the scale reading being obtained from an altimeter A correction for terminal velocity of bomb is introduced by means of an adjustable link between the altitude scale and the ground-speed wire When the ground-speed and altitude sighting wires are in alignment with the target, the bomb is released.

• • •

Tail-Skid for Aircraft

1,744,572 TAIL SKID FOR AIRCRAFT JAMES A. PENDERGRASS, Franklin Furnace Ohio. Filed April 24, 1929 Serial No. 357,913 7 Claims. (Cl 244—8.)

A TAIL-SKID in the form of a ball mounted in anti-friction bearings for universal movement within a member pivotally mounted for movement about a vertical axis The ball and its supporting member are supported in a cavity formed in the underside of the tail portion of the fuselage The support for the ball and member includes a frame which is connected to the fuselage by rubber-bands for the purpose of absorbing vertical shocks



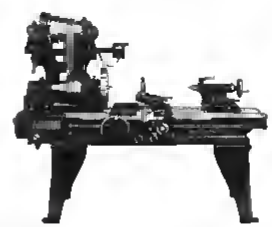
The illustration shows ball 4 mounted in member 3, and supporting frame 5-A connected to the fuselage at 5 by rubber bands 6.

THE BUYER'S LOG BOOK

South Bend Lathe

THE South Bend Lathe Works has just introduced a new 9 in lathe which, like the previous lighter models is a back-geared screw cutting precision tool, but is distinctly different from former models in design. Its principal modification is a new headstock having a three-step cone of 1½ in width which according to the manufacturer, delivers 25 per cent more power than was possible on earlier models

Another change is provision of a new back gear shaft oiling system to protect the shaft from harmful effects of neglect or careless lubrication. Better oiling of spindle bearings is also provided and the spindle carries a new seal to prevent the accumulation of oil on the outside of the headstock. The new rear guards which strengthen the headstock casting, and a new means of securing the headstock to the lathe bed insure permanence of alignment of the headstock spindle and adapt this lathe to most precision machining in the manufacturing plant, machine shop and engineering laboratory It is available in several styles and sizes and with countershaft or motor drive



South Bend lathe and countershaft

Kipp Air Grinder

A NEW TOOL for die makers metal pattern makers and similar skilled artisans has recently been announced by the Madison-Kipp Corporation of Madison Wisconsin, manufacturers of lubricators and die casting machines. Toolmakers and precision mechanics will find the grinder useful for such work as making special end mills and getting just the proper radius and clearance on lathe and shaper tools

The grinder is held in the hand and used somewhat in the way that a man uses a fountain pen The overall length is 8¼ in., the barrel diameter slightly under 1 in and the weight is 12 oz In the housing at the upper end of the grinder a turbine wheel is carried on a spindle Compressed air applied by means of a special porting arrangement, provides a spindle speed of 40,000 r.p.m This produces a surface speed in excess of a mile a minute even with a half-inch wheel so that a rapid grinding action is produced The upper bearing is a grease-seal ball bearing, and the lower bearing a special bronze Both are provided with lubrication devices so that long service is assured. The exhaust air acts to keep the bearings cool at all times

The grinder complete for shipment includes hose, air connections and four grinding wheels A variety of small grinding wheels in many shapes is available

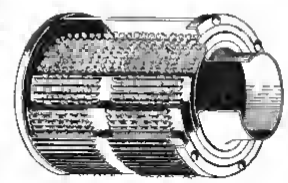
Glidden Pontoon Coating

THROUGH the emulsification of asphalt and water by a special process the Glidden Company, Cleveland, Ohio, has recently developed a pure asphalt coating for the interior of pontoons known as the No 12 Interior Pontoon Coating This product loses none of the asphaltic oils when water evaporation takes place, but the asphalt particles coalesce or flow together forming a pure asphalt coating which is waterproof and elastic

Backfire Trap

A BACKFIRE TRAP developed by the M. L. Oberdorfer Brass Company Syracuse, N. Y. is now being introduced to the aviation field to meet the need for such a device both as an air cleaner and as a safety precaution The device is attached to the air intake of the carburetor and can be used with practically any type of carburetor It is made throughout of non-corrosive metals and will stand the force of terrific backfire

The backfire trap acts as an effective cleaning device, providing ample air flow and thus aiding the proper performance of the motor It consists of a series of concentric cylinders The flame of a backfire explosion is forced into the trap where it is broken up into hundreds of tiny jets It then has to force its way through three louvered sections which further break up the force and flame and also reverse the direction During the process the gases are cooled to the point of harmlessness



The Oberdorfer backfire trap

TRADE CATALOGS

▶ *Floodlighting* A highly illustrated bulletin entitled "Floodlighting for Recreation" shows how through the medium of floodlighting large areas may be illuminated at night The illustrations include types of illumination suitable for athletic fields, tennis courts and parks.

▶ *Lebanon furnace* "How Lebanon Adds a New Chapter to the Story of Steel Castings" is the title of a folder recently issued by the Lebanon Steel Foundry The outstanding features of their new continuous, oil burning furnace are presented, together with a discussion of the metallurgical advantages of the quench and draw treatment obtained by the furnace.

▶ *Manley compressors* Information that will assist service station operators to select the proper compressor for their needs is included in a new catalog on Manley Air Compressors just issued by the Manley Manufacturing Company

"X" Liquid

LIQUID "X" for repairing or preventing leaks in heating and power systems may be obtained from the Canfield Supply Company, Kingston, N. Y. "X" is a combination of chemicals producing a true liquid which mixes freely with water On being poured or injected into hot water, it seals the leaks as it trickles out and comes in contact with heat and air

Goodyear Gasket Cement

A GASKET CEMENT said to retain its elasticity in use has just been placed on the market by the Goodyear Tire & Rubber Company, Akron, Ohio The cement, which is made of orange shellac and other elastic gums, is used to hold cylinder head gaskets in place while the head is being replaced and to form a seal that will insure a leakproof gasket joint This product is also suitable for other uses in the airplane such as the fastening and waterproofing of electric wires

SIDE SLIPS

By
Robert R. Osborn

THIS FELLOW C F McR seems to be in again with another protest about our lack of respect when dealing with aeronautical activities on the Pacific coast The part of his letter which is fit to print in a fine upstanding family magazine is as follows:

"I cannot understand why you so completely disregard the tremendously important gliding activities now taking place in this and other sections of the country I, for instance, hold the world's record for glider landings, having been able to make a grand total of sixteen landings in my first six tries I suppose if I'd been carrying an electric stove you'd have printed that one Again seriously, I do want to put in a word for the California glider pilots Of course you have heard of Lindbergh, made famous by his five mile flight over the mile high Ridge Route mountains guided by but one aileron and that one grieving over the loss of its mate,—and Harry Bowlus has also probably been brought to your attention through his even more astounding record of a night take-off and six hour endurance flight above the rugged coast line of Southern California in the dead of night, with the wind howling and the storm clouds swirling overhead, while the flickering moon strove vainly to be seen and the lowly cactus plants made swishing noises along the rock bound bluffs It is a fact that Bowlus flew much of the time within a few feet of the Point Loma hillside while he held a flashlight in one hand in order to keep from running into telephone wires, poles or cactus plants Not that the flashlight itself had any mystic power which warded off the dangers surrounding him, but its feeble rays did serve to guide the wanderer of the skies to a safe haven"

Come to think of it we had heard of some glider activities on the Pacific Coast, but thought it must have been the work of a lot of amateurs, as we knew very well that no true California flyer would be interested in flying a ship having no motors nor landing gears to overhaul and repair while in flight

• • •

Apparently the California flyers go in for aviation in a big way even when they are students in training From the same C. F. McR. of Los Angeles, Cal comes a clipping stating, "in order to make more room for the solo students of the —— flying school to land, the grandstand used during the 1928 National Air Races was recently removed from the Los Angeles airport"

As we remember it this grandstand was on one edge of a beautiful field about a mile square so we take it that the students must be doing hundred ship formation landings

• • •

Apparently Mexico is starting a campaign of astounding news events in competition with California and Winsted Connecticut Miss H L. of Torreon Coahuila, Mexico, says that, shucks this feat of Waterman and Goebel of changing from pants to pants in mid-air wasn't worth printing compared to things which happen in Mexico Her letter says, "A Mexican aviator was flying along at 10,000 feet enjoying a tail wind Suddenly, he hit a bump with such force and violence that his safety belt gave way and his head struck a steel fuselage member, bending it and putting the pilot to sleep When he woke up, he found the airplane flying itself out of a dive, two hundred feet above the mesquite. He is undecided whether to protest the decision of the Guggenheim Safe Aircraft Competition judges, or to have the Contest Committee of the National Air Races include a similar event in its program Anyhow, the fuselage member was bent I saw it afterwards"

The first item which makes us doubt this story is that business about the tail wind,—as we are a hearty supporter of the Will Rogersian theory that no pilot ever admits he had a tail wind to help him Another point which prevents us from entering this record in the book unprotested is that a bent fuselage member is no proof of anything. In fact all fuselage members are bent, and a private investigation we conducted once showed that pilots and mechanics spend ninety per cent of their time going around bending fuselage members We were even thinking of putting out a ship with all fuselage members already bent but decided that this would be so much of a disappointment to the pilots and mechanics that they would boycott the ship

So if Miss H L. hopes to obtain any official recognition in this space she has to submit some real proof

• • •

Miss Amelia Earhart calls our attention to an item in "Sky Travel" by A Ralph and Margaret Romer, Rand McNally and Co

"His trained ear would quickly detect any unusual sound in their roar Then he fed up all three motors at once and was satisfied that they sounded exactly as they should."

The Intrepid Aviator saw Miss Earhart's note and remarked, as he lit one of our cigars, that all of the OX's he ever had in his Jenny had sounded fed up most of the time, but he hadn't minded as he considered himself lucky when he got any sound out of them at all

• • •

No one could be more enthusiastic about the ability of Colonel Lindbergh than we are, but we do think that the newspapers occasionally get him into situations which would be disturbing to even a Dick Merriwell The most recent example of this is in the clipping from the *Philipsburg Journal* discovered by J G U of Kylertown, Pa. "Colonel Charles A. Lindbergh today is receiving due congratulations upon his twenty-eighth birthday and a narrow escape from death, near here, yesterday when the glider he was piloting dropped to the ground leaving the Colonel three hundred feet in the air"

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Plowman lifts his head

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(Continued from opposite page)

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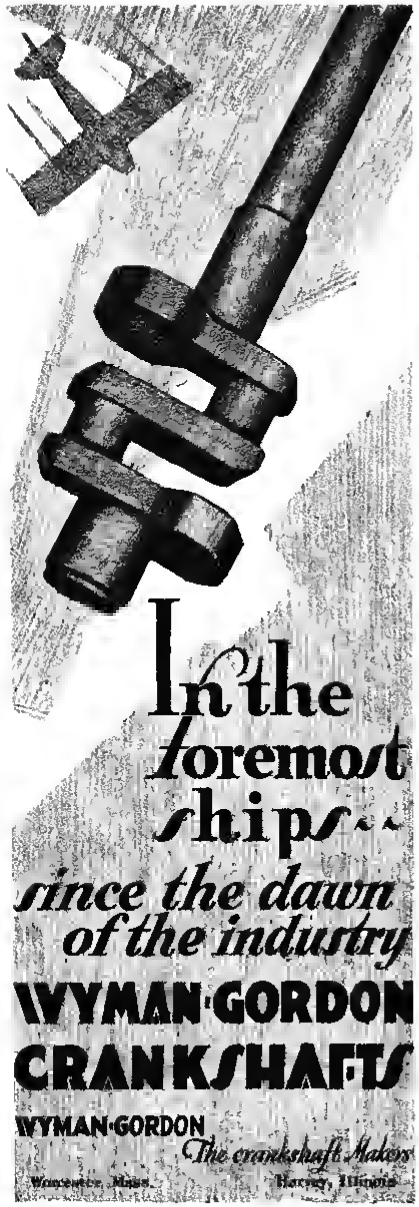

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